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No. 529 JANUARY, 1907 Vol. XLV

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

PAGE

Observations on *Sarracenia*. By J. M. Macfarlane, D.Sc. 1

Plants of the English Lake District. By the Rev. W. Moyle Rogers, F.L.S. 8

A Revision of *Bersama*. By Edmund G. Baker, F.L.S. 12

Plantago lanceolata L. var. *sphærostachya* Rohl. By G. Claridge Druce and James Britten .. 21

Notes on *Limonium*. By C. E. Salmon, F.L.S. 24

The New Rules for Nomenclature .. 26

Report of Department of Botany, British Museum, 1905. By A. B. Rendle, D.Sc. 29

Thrincia nudicaulis. By James Britten, F.L.S. 31

PAGE

Short Notes. — *Cystopteris fragilis* in Suffolk. — Plants of Wybunbury, Cheshire. — *Ophrys Trollii* Hegetschw. in Oxfordshire. — *Parietaria officinalis* L. — *Vicia monosperma*. — *Aspiciiia Lilliei* .. 33

Notices of Books:—

Index Filicum sive Enumeratio omnium generum specierumque Filicum et Hydropteridum ab anno 1753 ad annum 1905, &c. By Carl Christensen 35

Indian Trees: an account of Trees, Shrubs, Woody Climbers, Bamboos and Palms indigenous or commonly cultivated in the British Indian Empire. By Dietrich Brandis, K.C.I.E., &c. 36

Progressus Rei Botanicæ. Redigiert von Dr. J. P. Lotsy 38

Book-Notes, News, &c. 39

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VOL. XLV.

ILLUSTRATED WITH PLATES AND CUTS

LONDON:

WEST, NEWMAN & CO., 54, HATTON GARDEN.

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Directions to Binder.

TAB. 484 . . . . . to face page 81

„ 485 . . . . . „ 169

„ 486 . . . . . „ 217

„ 487 . . . . . „ 417

PORTRAIT OF FREDERICK JUSTEN . . „ 62

„ MAXWELL TYLDEN MASTERS . „ 257

„ EDWARD ARTHUR LIONEL BATTERS „ 385

Or all the Plates may be placed together at the end of the volume.

The Supplement ('A Flora of Glamorganshire') should be placed separately at the end of the volume.

THE JOURNAL OF BOTANY

BRITISH AND FOREIGN.

OBSERVATIONS ON *SARRACENIA*.

By J. M. Macfarlane, D.Sc.

I.—History of the Generic Name.

During recent years vigorous efforts have been made toward correct determination and application of generic and specific names. This has resulted in the disentangling of not a few complicated webs of botanical history, and has laid bare not a few botanical errors and prejudices. Until quite recently the writer did not suspect that the generic name *Sarracenia* had other than a simple and exact history; he now finds that this history has been a chequered one. Most have been aware that Tournefort wrote the dedicatory name *Sarracena*, though he wrote the Quebec botanist's name "Sarrazin"; that Linnæus altered this to *Sarracenia*; and that Hoffmannsegg protested against both spellings, and suggested that the genus be written *Sarrazenia*. The history seems to be as follows.

In 1719, Tournefort,* ignoring the older names of *Coilophyllum*, *Bucanephoron*, *Bucanephyllon*, &c., applied by his predecessors, wrote: "*Sarracenam* appellavi a Clarissimo D. Sarrazin, Medicinæ Doctore, Anatomico et Botanico Regio insigni, qui eximiam hanc plantam, pro summa qua me complectitur benevolentia è Canada misit." As his description and figure show, he referred only to *S. purpurea*, and in his generic dedication had in view a Canadian medical man and scientist, by name Sarrasin or Sarrazin, who did active work about the years 1700–1720. But in Tournefort's "Explicatio Nominum," prefaced to his *Institutiones*, is "Sarracenus, Gallice Sarrazin, Medicinæ Doctor peritissimus, apud Canadenses Botanicus et Anatomicus Regius, accuratissimus Rerum Naturalium explorator." The above clearly shows that Tournefort regarded his Quebec correspondent's name to be most neatly expressed in Latin as Sarracenus, and so he named his genus *Sarracena*. At the same time, and probably wrongly, he applied

* *Institutiones*, i. 657 (*sphalm.* 567) (1719).

the French word for *Fagopyrum esculentum*, or Buckwheat, to the physician.

An examination of the Memoirs of the French Royal Academy of Sciences from 1700 to 1720 shows that the Quebec scientist was no ordinary worker. Thus, in *Mémoires de l'Académie Royale des Sciences*, xix. 48 (1704), is a long communication entitled "Extrait d'une Lettre de M. Sarrasin, Medecin du Roy en Canada, touchant l'anatomie du Castor, lue a l'Académie par M. Pitton Tournefort; de Quebec le 25 Octobre, 1700"; the above title and succeeding paper are exactly reproduced in English in Martyn and Chambers's *History and Memoirs of the Royal Academy of Sciences*, ii. 181 (1742). A perusal of the paper, even in its apparently abridged form, shows that the author must have been an exceptionally acute observer and investigator, and have well deserved the encomium passed on him by the French traveller Charlevoix *— "On est surpris de trouver dans une colonie un homme d'une mérite aussi universel, aussi habile dans la medecine, dans l'anatomie, dans la chirurgie, et dans la botanique, que M. Sarrasin, qui a l'esprit fort orné et ne se distingue pas moins dans le conseil supérieur, dont il est membre, que par son habileté dans tout ce qui est dans sa profession." In Martyn and Chambers's *History and Memoirs*, iv. 253, is "The History of the Carcajou, an American Animal. M. Sarrasin, the King's Physician at Canada, and a Correspondent of the Academy, from whom we have seen a very curious and exact history of the Castor or Beaver in the Memoirs of 1704, has also sent such another of the Carcajou, of which we here give an abridgment"; and then follow two pages of description. In the same volume is a paper "Of the American Rat, or *Mus alpinus*. M. Sarrasin, physician at Quebec," &c.

It will be noted that, alike in Charlevoix's account and in the French Academy Memoirs, the name is spelt Sarrasin. But in the original Swedish edition of Kalm's *Travels* two correct index page-references are given to Sarrasin; in the English edition both are omitted, although the descriptions to which the page-references would have guided are retained. In the earlier quotation the name is spelt Sarrasin, and reference is made to his death by malignant fever while visiting the sick at the hospital in Quebec. In the second quotation (iii. 165 (1771)) we read, "Dr. Sarrazin has therefore (as I was told by the eldest of the two Jesuits here) got a small quantity of wheat and rye, of the winter corn sort, from Sweden."

From Rees's *Encyclopædia* we learn that "Sarracenia was so named by Tournefort in honour of his friend Dr. Sarrazin, who collected numerous plants in Canada, specimens of which we have seen in the dried collections of the Museum at Paris. While they lay there for ages unnoticed, the discovery of the same plants has been attributed to more recent travellers, who indeed could know nothing of Dr. Sarrazin's acquisitions." Provancher's *Flore Canadienne*, i. 30 (1862), is "Dédié par Tournefort au

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* *Voyages*, p. 97.

Dr. Sarrasin, de Québec, qui vers 1730 lui envoya du Canada la première Espèce connue." The date, as well as the latter part, is erroneous, but Sarrasin may have lived till after 1730, for Kalm was there in 1749, when the Quebec naturalist's death seems to have been fresh in mind.

In Catesby's *Flora of the Carolinas*, in Gronovius's *Flora Virginica*, and in Linnæus's *Hortus Cliffortianus*, Tournefort's generic spelling is retained, but Linnæus (*Species Plantarum*, ii. 510 (1753)) changed it to *Sarracenia*, a terminology that was generally accepted till 1824. Then Hoffmannsegg ‡ introduced alike confusion and doubt into the situation by confounding the Quebec naturalist with Dr. Jean Antoine Saracen, of Lyons, and by insisting that since Tournefort spelt his correspondent's name Sarrazin, the genus should be written *Sarrazinia*, "in honorem D. M. quondam celebris gallici, Sarrazin"; accordingly he adopted his new form. From that time to the present day this mixing up of the two authors has been largely perpetuated. It seems appropriate, therefore, that the separate identity of the Lyons naturalist should be clearly established. Had Hoffmannsegg carefully perused the *Isagoge in Rem Herbarium*, prefixed to and consecutively paged with Tournefort's *Institutiones*, he could not have failed to discover that two naturalists of somewhat similar name had lived about a century apart. Thus, on p. 37 of *Isagoge*, Tournefort writes: "Cum Camerario conjungi debet Janus Antonius Sarracenus Lugdunæus, cujus demum summa cura et diligentia Dioscoridis opera si pristinæ dignitati non fuerint restituta, summum tamen nitorem adepta sunt: nec adeo multum superest quod intelligi nequeat, si Conringio credamus. Sarracenus enim plurimorum codicum potitus et cæterorum interpretum labore adjutus," &c.; and on p. 65: "Lignonius demum et Sarracenus viri optimi, quorum prior in insulis Americanis, alter in Canada Regis mandato plantarum inquisitioni incumbunt."

In spite of the above clear distinctions, Hoffmannsegg credited the Quebec naturalist with the names Jean Antoine, and this has led subsequent botanists astray. Thus Wittstein, in his *Handwörterbuch*, ed. 2, 787 (1856), condenses the history of the genus thus:—"*Sarracenia*, L. Nach Jean Antoine Sarrasin, Arzt in Lyon, gab 1598 eine Uebersetzung des Dioscorides heraus.—Ein anderer Sarrasin, Arzt in Quebeck in der ersten Hälfte des 18. Jahrhunderts, schrieb über die Naturgeschichte Canadas." It will be observed here that Wittstein wrongly credits the dedication of the genus to the Lyons physician, and only refers to the real recipient of that honour. It is scarcely surprising, therefore, that Pritzel, in his *Thesaurus* (p. 278), falls into a similar mistake: "Sarrasin, Jean Antoine, Arzt in Lyon, Uebersetzer des Dioscorides (*Sarracenia*, L.).* Lyon 25 April 1547,† Lyon 29 Nov. 1598." This mistaken dedication of the genus has been perpetuated up even to the present day, and in careful manuals; in Britton and Brown's *Flora of the N. States and Canada*, ii. 159 (1897), we read, "Named

‡ *Verzeichniss der Pflanzenculturen*, 223 (1824).

in honour of Dr. Jean Antoine Sarracin, a botanist of Quebec." Such mistakes have doubtless originated from consultation of Wittstein's and Pritzel's works.

The subjoined is a brief summary of the facts relating to the two botanists:—

Dr. Jean Antoine Saracen, or Sarracen, a physician of Lyons, France, who issued a translation of Dioscorides in 1598; b. 25th April, 1547, d. 29th Nov. 1598.

Dr. D. Sarrasin, physician, anatomist, and botanist of Quebec. Correspondent of Tournefort, who dedicated the genus *Sarracena* (*Sarracenia* L.) to him. Correspondent of, and contributor to, the French Royal Academy of Sciences from 1700 to 1714. Died at Quebec (about c. 1730–1740?). Name by some spelt, but probably incorrectly, Sarrazin.

II.—Sarracenia Catesbæi Elliott.

In Contrib. Bot. Lab. Univ. Penn. ii. 426 (1904), I have traced the history of a very distinct species of the genus, whose home is in the Gulf States. From Elliott's short description, Dr. Small and the writer inclined to regard it as identical with Elliott's *S. Catesbæi*. But Elliott's type-specimen is now known to exist in the Charleston Museum, and through the kindness of Professor Rea, I have been able to examine it. Study shows it to be a natural hybrid between *S. flava* and *S. purpurea*. Such a hybrid is at times frequent throughout the Southern States, and the writer has recently put on record * several localities where it is more or less abundant. Fully two years ago he discovered a typical leaf of the same hybrid in the Sloane Herbarium (xciii. f. 74). Consultation of Ray's *Historia*, ii. 1344 (1693), shows that that author described this specimen, and fully appreciated its differences in comparison with descriptions and figures of *S. purpurea*, published by Clusius and Parkinson. The specimen must therefore have been collected more than two hundred years ago, and is the oldest example of a hybrid known to us in the genus.

The Circum-Gulf species, formerly supposed to be identical with Elliott's *S. Catesbæi*, has now been named by the writer *S. Sledgei*, and the observations made in the *Contributions from the Botanical Laboratory* accordingly apply to it.

III.—Sarracenia Drummondii Croom.

Our knowledge of this species dates much further back than has hitherto been supposed, and opens up nomenclatorial points of some interest. Croom described it† from leaves gathered by Drummond in 1835, and from flowers gathered by Chapman in 1836, both collected round Appalachicola. But the plant had been collected, described, and named many years before by W. Bartram, by M. Robin, and by Rafinesque. Before referring to their records,

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* Internat. Hybrid. Congress Report, London, 1906.
† Ann. Lyc. N. H. of N. York, iv. 100 (1848).

it may be well to emphasize that the only other species with which the present might be confused is *S. minor* (*variolaris*). The geographical range of the latter species is along the Atlantic coastal plain, from southern North Carolina to north Central Florida, but it never seems to cross the land divide that separates the Atlantic and Gulf coastal plains. *S. Drummondii*, on the other hand, is only known in Florida on the gulf side of the divide, from near Appalachicola on the east to the Alabama River on the west.

In his *Travels*, ed. 2, 417 (1794), W. Bartram describes *S. lacunosa*, which he found round Pensacola. He says: "In the level wet savannas grew plentifully a new and very elegant species of Saracinia (*Saracinia lacunosa*); the leaves of this plant, which are twelve or fourteen inches in length, stand nearly erect, are round, tubular, and ventricose; but not ridged with longitudinal angles or prominent nerves, as the leaves of the Saracinia flava are; the aperture at top may be shut up by a cap or lid, of a helmet form, which is an appendage of the leaf, turning over the orifice in that singular manner; the ventricose, or inflated part of the leaf, which is of a pale but vivid green colour, is beautifully ornamented with rose-coloured studs or blisters, and the inner surface curiously inscribed, or variegated, with crimson veins or fibres. It was past the time for flowering, but the plant in any situation is a very great curiosity." The locality and description alike absolutely prove his species to have been identical with *S. Drummondii*. But, regarding *S. lacunosa* as a synonym of *S. minor*, R. M. Harper says,* "Bartram's description of *S. lacunosa* is sufficiently complete to leave no doubt as to what species he had in mind, and his name antedates that of Michaux by a dozen years." In a later paper † he returns to the subject, and gives as synonyms of *S. minor*, "*S. lacunosa* Bartr. Travels, 417, 1791. *S. variolaris* Michx. Fl. Bor. Am. i. 310, 1803." The portion of Bartram's description which has probably misled Harper is that in which he says, "the aperture at top may be shut up by a cap or lid, of a helmet form, which is an appendage of the leaf, turning over the orifice." But Bartram probably saw these plants in September–October, when the autumnal crop of finely coloured leaves were being produced, and so would note that the lid had at first a helmet form in the opening pitchers.

The direct statement by W. Bartram that he found his *S. lacunosa* near Pensacola, at least two hundred miles west of any locality for *S. minor*, that the pitchers were of a vivid green colour, ornamented with rose-coloured studs, and that the interior had crimson veins, demonstrate conclusively that his plant was identical with *S. Drummondii*, and his name should take priority.

The French writer, M. Robin, travelled in the Southern States from 1802–06, and published an account of his journey at Paris in 1807. He described many of his impressions of Pensacola, and (ii. 48) gave a graphic history of his finding the species now under consideration. His locality was probably the same as that from

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* Bull. Torr. Bot. Club, xxvii. 428 (1900).
† *Ibid.* xxx. 331 (1903).

which W. Bartram obtained his specimens, and which has been visited by the writer. While describing the pitchers accurately, he mistook these for a floral part—probably a spathe—and so says: "La fleur et son parapluie, colorés de blanc et veinés de rouge, ne présentent cependant aucun vestige de fécondation, ni étamines, ni pistils, ni ovaires," &c. Having no special botanical proclivities, he failed to name the species so graphically described, but this want was supplied by Rafinesque,* who gathered Robin's account into the following diagnosis:—"17 *Sarracenia leucophylla* Raf. Foliis tubulosis, strictis, elongatis, teretis, albo coloratis, rubro venatis, intus retrorsum hirsutis, fauce undulata, appendice fimbriata dilatata operculis Ratpathe (*sic*) velu! Rob. p. 332, and v. ii. p. 48. Grows in swamps near Pensacola; leaves smelling like honey, and decoying insects, who, seeking for the honey, are entrapped within the leaves, and prevented to come out by the rigid thick hairs. Robin took the leaves for a flower or spatha."

Thus Bartram's *S. lacunosa* (1794) and Rafinesque's *S. leucophylla* (1807) alike antedate Croom's name (1848), and both writers sufficiently characterize the species. It seems remarkable, therefore, that Gray, in his *Synoptical Flora*, i. 79 (1895), should say, under the section *S. Drummondii*, "*S. leucophylla* Raf. Fl. Lud. is essentially fictitious." One is at a loss to understand how a botanist—speaking of the work of another botanist, erratic though he may have been—should have so characterized a good specific description, even though drawn from the observations and descriptions of another. Granting, as seems to be true, that Rafinesque wrote his descriptions of species collected by Robin from the writings of the latter, without having seen his specimens, the reference to Rafinesque's diagnosis as "essentially fictitious" cannot be justified, particularly as Gray seems to have made no effort to compare Rafinesque's and Robin's descriptions, or to ascertain if such a plant grew in the Pensacola region.

IV.—Sarracenia minor Walt. (S. variolaris Michx.).

This species was first sufficiently described by Walter under the above name in his *Flora Caroliniana*, p. 153 (1788). Though his nomenclature has since been retained by various European and American botanists, the later name of Michaux—*S. variolaris*—has gained greater popularity. I do not see, however, that the prior name should be supplanted, especially as it has gained fairly wide acceptance. But the species was known much earlier, and several good specimens exist in the older herbaria which long antedate Walter's time. Thus, in the Sloane Herbarium, vol. cccxiv. 34, are two leaves and three flowers of this species labelled, "Limonio congeneri Clusii affinis." Ray's description is by no means so perfect as might be desired, but it antedates that of Walter by fully eighty years.

Mr. Britten has brought together information regarding the collector William Young,† and he kindly drew the writer's attention

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* *Florula Ludoviciana*, 14 (1817).

† Journ. Bot. 1894, 332.

to the herbarium and book of drawings made by Young, which are in the Department of Botany of the British Museum. Numbers are given on the herbarium sheets which portend to correspond with like numbers on the sheets of drawings; but a slight comparison shows that the specimens and drawings do not correspond. On p. 11 of the herbarium is an example of *S. minor* leaf, and alongside it a flower that is more likely a small one of *S. flava* than an average one of *S. minor*, though minute examination would alone determine accurately. But No. 34 in the book of drawings is a rough though quite typical illustration of *S. psittacina*, so that both species must have been collected by Young before 1767.

We now come to Walter's period. On a single page of his "Herbarium Carolinianum," which is also preserved in the Department of Botany, are examples with names attached of *S. flava*, *S. rubra*, *S. purpurea*, and *S. lutea*. The specimen bearing the last name was published by Walter as *S. minor*, as has already been pointed out by R. M. Harper.* But *S. lutea*, though probably a *nomen nudum*, has been more widely published than has hitherto been suspected, and this through the medium of Frasers' Garden Catalogues. Mr. Britten has reprinted two of these (Journ. Bot. 1899, 485; 1905, 329) from copies existing in the Department of Botany, and Prof. Greene published a third—the latest in date and botanically (though not in this case) the most important—in *Pittonia* (ii. 116; 1890). In the earliest, probably published 1794–5, a footnote to the list of seeds offered for sale runs:—"Living plants of the above seeds, as well as Phloxes, New Magnolias, Rhododendrons, the four distinct species of Sarracenias mentioned in Walter's Flora Carolina, &c., many of which are not to be found as yet in any other persons' possession but himself, will be ready for inspection in a short time." In the second Catalogue, bearing date April 8th, 1796, it is said: "J. Fraser begs leave to inform the public that he has completed his fifth voyage from America, and has procured the following plants and seeds, which he intends to dispose of at very moderate prices." Then, on the second page, are offered "*Sarracenia flava*, *rubra*, *lutea*, and *purpurea*"; so from this it is evident that the name *lutea* obtained currency for a time. We may hazard the conjecture that *S. lutea* probably originated with the Fraser firm, but for some reason was rejected by Walter in favour of his *S. minor*. The third Fraser Catalogue merely says, "Sarracenia, four species."

In the volume of drawings prepared by W. Bartram for Dr. Fothergill, now in the Department of Botany, British Museum, is a bold and characteristic figure of *S. minor* (p. 63), which must have been made before 1780. This may be the plant intended by W. Bartram under the name *S. galeata*, published (without description) in the Introduction to his *Travels* (p. xviii). It must however be borne in mind that he must often have traversed hundreds of acres of land abounding in *S. psittacina*, and it is quite possible that this was the species he intended by the name.

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* Bull. Torr. Bot. Club, xxx. 331 (1903).

PLANTS OF THE ENGLISH LAKE DISTRICT.

By the Rev. W. Moyle Rogers, F.L.S.

These few notes are supplementary to those of Messrs. Ley and W. R. Linton, published in this Journal, 1906, pp. 171-3, as well as to Mr. J. G. Baker's *Flora of the Lake District*, and Mr. A. W. Bennett's paper in this Journal for 1885, pp. 330-1.

They refer to plants observed by me in the district last summer, during a first visit, which lasted five weeks and included all July. They also contain a few localities from which my daughter brought me living specimens. These are distinguished from the rest by the addition of her initials, M. A. R. The lakes, the shores and neighbourhood of which I partially botanized, were Windermere, Ullswater, Grasmere, Thirlmere, and Derwentwater. While examining the general flora as completely as I could at from 300 to 800 ft. above the sea-level, I paid especial attention to the Rubi; and my full report of these, given below, includes a description of one of the most generally distributed and most constant forms met with, which is certainly new to our British list, and distinct from all the allied Continental forms represented in my herbarium. For this I am suggesting the provisional name *R. lacustris*. Localities for it, and for all the other brambles seen, are given in detail; but a brief summary of the results may not be out of place here. My *R. dasyphyllus* (*R. pallidus* Bab. non Wh. & N.) proved to be far the commonest, as usually the most luxuriant, fruticose Rubus throughout the district; as I believe it to be in the hilly parts of North England generally. At times it was the only bramble seen for miles; and in most neighbourhoods it seemed at least as abundant as all other forms put together. Next after it in frequency came *R. Selmeri* Lindeb.; and then, I think, my *R. lacustris*. *R. pulcherrimus* Neum. seemed to be the only other common bramble; though *R. Lindebergii* P. J. Muell., *R. Lindleianus* Lees, and a few of the Suberecti were fairly frequent locally. Cæsians were all rare, and nearly all the glandular forms; while *R. leuchostachys* Sm. was confined to two localities, and I altogether failed to find *R. rusticanus* Merc. and several other of our frequent south country species. This experience might of course have been considerably modified had I been able to explore the country to the west of Grasmere and Derwentwater, or even to examine more exhaustively the country through which I passed.

The two counties Westmoreland (*Top. Bot.* 69) and Cumberland (70) are indicated by their initial letters; and what I believe to be new records for either have an asterisk prefixed.

Ranunculus Lenormandi F. Schultz. C. Near Threlkeld, Keswick.—*Trollius europæus* Linn. W. By Goldrill, about midway between Patterdale and Brothers' Water; in good quantity.

Meconopsis cambrica Vig. The great abundance of this throughout the district is so remarkable as to justify its claim to be a denizen at least in both W. and C. It occurs by the River Rothay,

between Rydal and Ambleside, as well as by remote farms and round the lakes and villages. I saw no *Papaver* or *Fumaria*.

Cardamine amara Linn. var. *lilacina* F. B. White. C. By Aira Force, on damp rocks in deep shade; in some quantity. Apparently the var. *erubescens* Petermann. See p. 316 of this Journal (1906) for note from the Watson Exch. Club. Rep. 1904–5.—*Cochlearia alpina* H. C. Wats. In great beauty by Grisedale beck (W. and C.).

Polygala oxyptera Reichb. W. Patterdale; Howtown. In several places, but only thinly scattered. C. Glencoin. The usual hillside form, and apparently more frequent up to 800 ft. above sea-level than *P. serpyllacea* Weihe. But the sparse representation of the genus for several hundred feet below this level is remarkable. I saw no *P. vulgaris* Linn. *P. oxyptera* is not recorded for either county in *Top. Bot.* or in Mr. Arthur Bennett's "Supplement" (*Journ. Bot.* 1905); but Mr. Baker, in his *Flora*, says that he has seen it on Whitbarrow.

In the following notes on the distribution of the fruticose Rubi I give usually all my localities, so in a few instances repeating and confirming previous records. — *R. fissus* Lindl. W. Upper Langdale; Brothers' Water to Ullswater, in several places and considerable quantity.—*R. suberectus* Anders. W. Rather frequent at Langdale Head by small becks.—**R. sulcatus* Vest. C. Burns, near Threlkeld; in dense thickets for about fifty yards of exposed wet ditch. Undoubtedly this species, and growing in great luxuriance, though, as in some other English counties, with less conspicuously large flowers than in the type.—*R. plicatus* Wh. & N. W. Upper Langdale. C. Threlkeld.—*R. Rogersii* Linton. W. In good quantity about half-way between Chapel Stile and Langdale Head. Red Bank Wood, Grasmere.—*R. incurvatus* Bab. W. Kirkby Lonsdale, by River Lune; Casterton to Middleton, very luxuriant and in great quantity.—*R. Lindleianus* Lees. W. By Windermere. In several places round the lake at Grasmere, and between Grasmere and Rydal. Between Coniston and Ambleside (South Lancashire), *M. A. R.*! C. Watermillock, abundant.—*R. rhamnifolius* Wh. & N., *sp. coll.* W. In two or three spots near Windermere and Langdale, but nowhere quite characteristic. C. In one place by Ullswater, near the Westmoreland border.—**R. nemoralis* P. J. Muell. C. By Derwentwater, in two places near Friars' Crag; very characteristic.—*R. Scheutzii* Lindeb. C. Threlkeld; frequent, and identical with the common Scottish plant.—*R. pulcherrimus* Neum. Widely distributed and locally abundant in both counties. —*R. Lindebergii* P. J. Muell. W. Fairly frequent and very luxuriant at Langdale Head and round Grasmere. C. Watermillock. By Thirlmere, on both sides. Threlkeld.

R. lacustris, sp. (vel subsp.) nov. *Stem* only moderately arching, dull greenish red, at first *with fairly many long white hairs* (clustered and single), glabrescent, *subsulcate*. *Prickles many*, rather short, mostly declining and stout based. *Leaves* 5-nate, chiefly pedate, *small*, with long strongly armed petioles. *Leaflets* conspicuously *narrow*, thin, usually not imbricate, green and strigose above, paler and at first considerably hairy (though rarely felted)

beneath, *sharply serrate, with compound teeth towards the point*; terminal narrowly obovate with fairly long cuspidate-acuminate point, narrow subcuneate emarginate base, and strongly armed petiolule nearly or quite half its length; the short hooked pricklets of all the petiolules extending far up the midribs. *Panicle* long, *rather broadly cylindrical*, lax, racemose above, with patent or subpatent 2–4-flowered branches in the middle, and two or more ascending racemose branches below; *with many strong, declining and falcate prickles and pricklets* on the greenish hairy rachis and pedicels; rachis rather wavy; leaves 3-nate below, with several narrow lanceolate-acuminate ones above (in well-developed panicles) and some deeply cleft bracts. *Flowers many, very handsome and starlike* in sunshine. Sepals externally greener than in most Rhamnifolians, but densely hairy; with short stout acicles, and narrow white margin; strongly reflexed on fall of petals. Petals large, white, broadly obovate but not contiguous. *Stamens many, conspicuously long*, white, far exceeding greenish styles. Frequent and constant by the lakes and streams, and in hedges, W. Langdale Head to Grasmere. About Patterdale and the south end of Ullswater (immature, but apparently identical). South Lancashire. Between Coniston and Ambleside, *M. A. R.*! C. Watermillock. By Thirlmere and Derwentwater. Threlkeld. While strongly recalling *R. Lindebergii* in such conspicuous characters as the strongly armed and somewhat wavy panicle-rachis (with a tendency to fasciculation in the upper branches), the obovate outline of the leaflets and the handsome white flowers, *R. lacustris* differs from that species constantly in its weak subsulcate stem, narrow thin green leaflets with sharp compound teeth in the upper half, and (most markedly) by its many broad compound panicles, which, in spite of the comparative smallness of the bush, make this one of the most conspicuous brambles at the Lakes, where alone I have seen it. From *R. pulcherrimus* Neum. and *R. Maassii* Focke, which seem to be its other nearest allies, its subsulcate stem, narrow leaflets and broad large-flowered and strongly armed panicle separate it readily. *R. Maassii* further differs from it by its "quite glabrous" stem.

R. mercicus Bagnall var. *bracteatus* Bagnall. W. Easedale, *M. A. R.*! Grasmere, abundant. Near Casterton. C. By Derwentwater. Very handsome and luxuriant in both counties.—*R. Selmeri* Lindeb. Frequent. W. Patterdale. Langdale. Rydal to Grasmere. Kirkby Lonsdale neighbourhood. S. Lancs. Near Coniston, *M. A. R.*! C. By Thirlmere and Derwentwater. Threlkeld.—*R. pyramidalis* Kalt. C. Threlkeld (a weak form). Seen nowhere else.—**R. leucanthemus* P. J. Muell. ? W. Grasmere; luxuriant and in good quantity.—*R. leucostachys* Sm. S. Lancs. Coniston, *M. A. R.*! C. Near Aira Force. Not seen elsewhere.—*R. infestus* Weihe. W. Langdale, in two or three places.—*R. Drejeri* G. Jensen. W. By stream in valley below Dungeon Ghyll. Strong, with white petals.—*R. radula* Weihe, *subsp. *echinatoides* Rogers. W. Red Bank Wood, Grasmere.—*R. fuscus* Wh. & N. W. Rydal, in some quantity.—*R. hystrix* Wh. & N. W. Rydal,

wood border.—*R. dasyphyllus* Rogers (*R. pallidus* Bab.). W. and C. Very common from Windermere by Patterdale to Ullswater, and from Langdale Head by Ambleside, Grasmere and Thirlmere to Keswick and Threlkeld. From Kirkby Lonsdale by Casterton towards Tebay.—*R. corylifolius* Sm. *sp. coll.* C. Watermillock.—*R. cæsius* Linn. W. By River Rothay, between Rydal and Ambleside. By River Lune at Kirkby Lonsdale. Apparently uncommon. In addition to the foregoing (which I felt able to name without hesitation), I saw immature bushes which seemed to belong to **R. dumnoniensis* Bab., in two or three places in Patterdale (W.), and others which looked like **R. foliosus* Wh. & N., under trees on the western shore of Ullswater (C.); both of which should be looked for by those who visit the localities later in the season.

Alchemilla vulgaris Linn., a. *pratensis* (Schmidt). C. Watermillock. Threlkeld. — b. *alpestris* (Schmidt). W. Patterdale. Langdale. Grasmere. Near Kirkby Lonsdale. — c. *filicaulis* (Buser). W. Orrest Head, Windermere. The Rev. E. F. Linton, who has kindly examined my specimens, thinks that there may be room for doubt as to the Orrest Head plant, but confirms my naming of the others.—*A. alpina* Linn. W. By Goldrill near its junction with Ullswater at about 420 ft. above sea-level, as well as higher up by Grisedale Beck towards Helvellyn. C. On the western shore of Thirlmere, almost to the water's edge.

Saxifraga aizoides Linn. W. Down to about 500 ft. above sea-level at base of Place Fell. C. Not far above the level of the water at Thirlmere.—*Cotyledon Umbilicus* Linn. W. Easedale, near Grasmere, *M. A. R.*!

Carum verticillatum Koch. W. Tebay, by Low Borrow Bridge, in plenty, *M. A. R.*! Not recorded for Westmoreland in *Top. Bot.* or *Suppl.*; but in his *Flora* Mr. Baker has the following note: "Gathered on Kingmoor (1882) by my friend Mr. W. Duckworth, of Stanwix, Carlisle (W. Hodgson)."

Myosotis palustris Relh. var. *strigulosa* Mert. & Koch. W. Patterdale. Rydal. C. Near Threlkeld. The variety frequent; type not seen.—*M. repens* G. Don and *M. cespitosa* F. Schultz were both abundant.

Mimulus Langsdorffii Donn. Alien. W. For a considerable distance along the beck below High Dungeon Ghyll Hotel.—*M. moschatus* Dougl.? A plant, which Mr. Edmund Baker has kindly examined and thinks must be a scentless form of this species, grows luxuriantly in a beck that loses itself in a quarry near Rydal (W.). No doubt a "garden escape," though now well established as a denizen.—*Veronica montana* Linn. W. Grasmere.—*Euphrasia officinalis* Linn. Abundant and flowering freely in both counties, but in most cases my specimens were not sufficiently mature for satisfactory determination. The one form as to which there could be no doubt was *E. Rostkoviana* Hayne. This was in great beauty by becks and in damp meadows at from 300 to 700 ft. W. Langdale Head and Valley. Through Patterdale up to the south end of Ullswater, and on Grisedale, below Helvellyn; crossing the border into Cumberland. Other forms, kindly examined for me by

the Rev. E. S. Marshall, are *probably* (1) *E. curta* Fr. var. *glabrescens* Wetts. W. Stony lane below Dungeon Ghyll. Grassy rocky hillsides at Grisedale, Rydal, and Tebay. (2) *E. gracilis* Fr. W. Stony lane below Dungeon Ghyll.

Melampyrum pratense Linn., var. *hians* Druce. W. and C. Abundant in many localities between Windermere and Derwentwater.

Orchis maculata Linn., type. W. Windermere to Kirkstone Pass. Patterdale, C. Aira Force.—Var. *ericetorum* Linton. W. Langdale. By Goldrill. Howtown. C. Western side of Ullswater, opposite Howtown.

Carex lævigata Sm. W. Patterdale, by a beck to the southwest of the Parish Church, on the eastern slope of Black Rigg, only slightly above the level of Ullswater; very characteristic. Described as "rare" in Mr. Baker's *Flora*, where, in addition to one Cumberland locality, Westmoreland is only credited with the record, "in some places about Windermere (F. Clowes)."

**Festuca Myuros* Linn. Wall-top in outskirts of Ambleside. A luxuriant well-developed clump seen only as I drove past, but I believe quite unmistakeable.

Phegopteris polypodioides Fée. W. Hill above Grasmere, towards Easedale.

Equisetum sylvaticum Linn. C. Threlkeld Valley, in great quantity.

A REVISION OF *BERSAMA*.

By Edmund G. Baker, F.L.S.

The genus *Bersama* was described by Fresenius (*Museum Senckenbergianum*, ii. 279) in 1837. The original description, which differs in one or two particulars from the description in Bentham & Hooker's *Genera Plantarum*, was as follows:—"Flores hermaphroditi regulares in racemum oppositifolium dispositi. Calyx inferus gamosepalus pentamerus, ob sepala 2 inferiora usque ad apicem bidentatum coalita 4-partitus. Corolla infera eleutheropetala, pentamera, petala sepalis alterna æstivatione imbricata. Discus annularis hypogynus inter petala et stamina. Stamina 5 petalis alterna filamenta infra in tubum ovarium cingentem coalita, antheræ filamentorum apici infra medium dorsi insertæ, oscillatoriæ biloculares loculis rima longitudinali dehiscentibus. Ovarium superum 5-loculare. Stylus filiformis. Stigma capitatum 5-lobum lobis crassis erectis.—Arbor foliis imparipinnatis, stipulis intrapetiolaribus, racemis oppositifoliis."

One species, *B. abyssinica*, is described and figured from Gondar Asamer, Tigre, Abyssinia, collected by Dr. Ruppell; of this there is a small specimen in the National Herbarium.

The genus *Natalia* was founded by C. F. Hochstetter (*Flora* xxiv. 663 (1841)) on a plant now known as *B. lucens* Szyl., collected by Krauss near the river Umlass in Natal. The principal characters differentiating it from the *Bersama* of Fresenius are the four stamens, the anticous being connate at the base, the posticous free;

the quadrilocular ovary attenuate above into a glabrous style; and the obtuse, subtetragonous stigma. Planchon (Trans. Linn. Soc. xx. 408) retains *Natalia* as distinct from *Bersama*; but recent authors, I think correctly, consider these genera should be united. In the case of *B. paullinioides* Baker, of which Vogel's type in the Kew Herbarium from Sierra Leone and the figure in Hooker's *Niger Flora* leaves no ambiguity, I have found several plants referred here from various localities which it seems advisable to separate. Thus I have ventured to distinguish plants from Angola, the Cameroons, and Uganda which have been placed here. I have not included in the following notes Holst. no. 2481, from Bipinde, Cameroons, which was distributed as a new species of *Bersama* but is either *Canarium Schweinfurthii* Engler, or a close ally.

The arrangement adopted by my father in the *Flora of Tropical Africa* was to place in the group *Natalia* the plants with four stamens, and in *Eubersama* those with five stamens, and Dr. Gürke (*Pflanzenfamilien*, v. 381 (1895)) groups the plants in a similar manner. But this character is by no means absolute, as in certain species—for instance *B. Gossweileri* and *B. nyassæ*—flowers occur with either four or five stamens, in the case of the former in the same raceme, and the capsule may be either four- or five-valved.

It seems advisable to leave as undetermined certain specimens where the material is not very complete; and in this connection I may mention a plant from Niamniamland, collected by Dr. Schweinfurth, no. 3884 in Herb. Kew., which is only in fruit; also Gerrard, no. 1428, from Natal, and certain plants collected by Welwitsch in Angola. The genus is placed in *Sapindaceæ* by Bentham & Hooker, but by Planchon, Gürke, Dalla Torre, and Harms, it is placed in *Melianthaceæ*.

For the purposes of the following revision I have studied the authentic material in the National and Kew Herbaria.

Bersama.

Fres. in Mus. Senckenberg. ii. 279, t. 17 (1837); Bentham & Hooker fil. Gen. Plant. i. 412; Baker in Oliver, Flora of Tropical Africa, i. 433–435; Gürke in Engler et Prantl, Pflanzenfam. iii. 5, 381; et in Pflanzenwelt, Ost-Afr. c. 252.

Natalia Hochst. in Flora, xxiv. (1841), 663.

Rhaganus E. Meyer in Drege, Zwei Pfl. Docum. 216 (1843), nomen.

A. Stamens generally 4, rarely 5.*

a. Leaf rachis unwinged.

* Leaves imparipinnate, generally 2–3-jugate. Leaflets obovate, entire, shining, 3·0–5·0–8·5 cm. long.

1. B. LUCENS Szyszyl. in Polypet. Rehmann ii. 50 (1888); Wood & Evans, *Natal Plants*, i. 71, t. 88 (1899).

Natalia lucens Hochst. in Flora, xxiv. 663 (1841).

Rhaganus lucidus E. Meyer, *l. c.* (nomen).

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* Flowers with 4 stamens or with 5 stamens occur in *B. Gossweileri* and *B. nyassæ*.

Hab. South Africa. Woods at Port Natal, *Drege*! *Krauss*, no. 71! Natal, *Gerrard*, no. 200! Inanda, *Wood*, no. 808! Near Durban, *Wood*, no. 6307! and no. 7392; *Rehmann*, no. 9057. Between Pinetown and Umbilo, *Rehmann*, no. 8042! Barberton, Golden Crescent Creek, *E. E. Galpin*, no. 849! Near mouth of St. John's River, *Bolus*, no. 8836!

A form with rather smaller leaflets than type occurs in the woods near the mouth of the Kei River, *Flanagan*, no. 421! In this species the ovary above passes abruptly into a rather long slender style; the stigma is clavate.

** Leaves generally trijugate. Leaflets ovate, or ovate-oblong, or narrowly obovate, 5·0–8·0 cm. long.

2. **B. Swynnertoni,** sp. nov. Arbor mediocris ramulis sulcatis cicatricibus foliorum delapsorum notatis; stipulis intrapetiolaribus amplexicaulibus; foliis imparipinnatis sæpissime 3-jugis cum impari rachi tenue exalata; foliolis ovatis vel ovato-oblongis vel anguste obovatis subcoriaceis glabris margine integris supra nitidis breviuscule petiolulatis apice subacuminatis basi cuneatis costa superne impressa nervis lateralibus tenuibus ante marginem inter se anastomosantibus; racemo plurifloro apicem versus confertifloro inferne nudo pedunculo sulcato; bracteis parvis subulatis; pedicellis calyci subæquilongis; petalorum lamina pubescenti oblongo-spathulata; staminibus 4 filamentis basi dilatatis duorum petalorum infimorum connatis 2 lateralium liberis; stylo inferne canescenti-pubescenti; ovario 4-loculari. Species ab *B. paullinioidi* Baker differt primo intuitu foliolis paucioribus sæpissime 3-jugis cum impari margine haud serratis, rachi exalata, stigmate minori, &c., ab *B. lucente* Szyszl. differt foliolis apice subacuminatis.

Hab. S. Rhodesia. Melsetter District. Chipete forest patch, alt. 3800 ft. "A fair-sized forest tree, flowers purplish pink." *C. F. M. Swynnerton*, no. 9! Herb. Mus. Brit.

Leaf-rachis 7·0–10·0 cm. long. Terminal leaflet 7·0–8·0 cm. long, 3·0–3·2 cm. broad at the broadest part. Lateral leaflets rather smaller. Petiolule of lateral leaflets ± 2–2·5 mm. long. Petals ± 8 mm. long.

"A fairly large tree, of which several specimens have been found, all in Chipete. The bark is dark brown and rough, and the foliage dark glossy green, and the tree makes a great show when covered with its handsome purplish pink flowers."—C. F. M. S.

*** Leaves 4–5-jugate. Leaflets oval-oblong, obtuse or shortly apiculate, glabrous or glabrate, 3·0–4·0 cm. long, 1·0–1·5 cm. broad.

3. B. Tysoniana Oliver in Icones Pl. t. 2267 (1894).

Hab. South Africa. Kaffraria, *Tyson*, no. 6216! Herb. Kew.

A very distinct species, noticeable on account of the rather small leaflets and almost globose fruit; very rough externally. The ovary gradually attenuate to the style.

I append a description of a closely allied plant referred to by Oliver, *l. c.* It seems advisable to await more complete material before naming it:—

Arbor vel frutex ? Ramulis cortice griseo tectis ; foliis sæpissime 4-jugis cum impari petiolulato, foliolis petiolulatis oblongis apice apiculatis lateralibus aliquantulum inæquilateralibus oppositis vel passim alternis basi cuneatis vel interdum rotundatis coriaceis margine integris vel plus minus serratis costa superne impressa subtus subconspicua nerviis secundariis tenuibus inter se juxta marginem anastomosantibus foliolis terminalibus oblongo-oblanceolatis foliolis proximis quam distalibus minoribus ; rachi omnino exalata ; pedunculis quam foliis brevioribus ; bracteis bracteolatis tomentosis ; sepalis dorso pubescentibus apice obtusis antico latiore apice bidentato ; petalorum lamina oblonga, disco semiannulari ; staminibus 4 basi dilatatis alte hirtis duorum petalorum infimorum connatis ; stylo erecto plus minus pilis vestito, stigmate capitato parviusculo ; ovario externe hirta.

Arbor vel frutex *B. Tysonianæ* Oliver valde affinis, differt ambitu foliolorum parum diversa præcipue latiori filamentis altius hirtis, &c.

Hab. Natal. *Gerrard*, no. 1428 ! Herb. Kew.

Rachis 10–11·0 cm. long. Leaflets 4·0–5·0 cm. long, 1·6–2·0 cm. broad. Petiolule of terminal leaflets ± 7·0 mm. long. Interjugal spaces 2·0–2·5 cm. long. Pedicels 2–5 mm. long. Calyx 3–4 mm. long. Petals ± 8 mm. long.

**** Leaves often 7-jugate. Leaflets ovate or ovate-oblong or ovate-lanceolate, coriaceous, glabrous, margin entire, reaching 8 cm. long and 2·0–2·8 cm. broad.

4. **B. coriacea,** sp. nov. Arbor sec. cl. detectorem elegantissima ; foliis ± 7-jugis cum impari subsessili, foliolis glaberrimis utrinque nitidis sæpissime circ. 3-plo longioribus quam latis ovatis vel ovato-lanceolatis basi cuneatis vel subrotundatis breviter petiolulatis apice subacuminatis costa subtus subconspicua nerviis lateralibus tenuibus margine integris oppositis vel passim alternis ; rachi omnino exalata ; floribus ignotis ; pedunculis fructiferis glabris pedicellis fructiferis validis ; capsulis lignosis 4 valviis externe atro-violaceis tenuiter rugulosis, spermis coccineis arillo cupuliformi munitis.

Species *B. integrifoliæ* Rich. affinis.

Hab. Lower Guinea. Angola, Malange N'Bango thickets, not uncommon, *Gossweiler*, no. 1414 ! Herb. Mus. Brit. ; Herb. Kew.

Rachis 15·0–25·0 cm. long. Leaflets 6·0–7·0 cm. long, 2·5–3·0 cm. broad. Capsule ± 1·5 cm. long, only slightly rugulose externally, not as in *B. Tysoniana* Oliver.

"A very elegant tree, 15 ft. or more high, erectly branched, leaflets coriaceous, glossy on both surfaces, capsule 4-valved, dusky violet, seeds scarlet with cup-shaped aril."—J. G.

The position of this plant must remain somewhat doubtful until flowering specimens have been obtained.

β. Leaf-rachis generally winged. Leaves 2–6-jugate. Leaflets elliptical or oblong, apex acutely acuminate or apiculate, glabrous.

5. B. acutidens Welw. ex Hiern, Cat. Welw. Pl. i. 173 (1896).

Hab. Lower Guinea. Angola, Golungo Alto, *Welwitsch*, no. 4536 ! 1697 !

γ. Leaf-rachis winged.

* Leaves 7–10-jugate. Leaflets papyraceous, shortly stalked, lanceolate or ovate-lanceolate, base more or less cuneate, apex shortly cuspidate, remotely serrate, reaching 9·5 cm. long and 3·5 cm. broad. Bracts rather short.

6. B. paullinioides Baker in Fl. Trop. Afr. i. 435 (1868).
Natalia paullinioides Planchon in Fl. Nigrit. 252, t. xxix. (1849).
Hab. Upper Guinea. Sierra Leone, *Vogel*, no. 99 ! *Barter* ! *Afzelius* ! *Smeathman* ! Tree in bush near Toureh, *Scott Elliot*, no. 4476 !

Various plants have been referred to this species which appear more or less readily distinguishable. I have not seen specimens of true *B. paullinioides* Baker from Angola. *Welwitsch*, no. 1699, from the spring of Quibolo, near Sange, is quite distinct, but is without flowers or fruit. The plant referred to the above from Fernando Po, *Mann*, no. 641, may also be distinct.

** Leaves 6–8-jugate. Leaflets glabrous, oblong, with a rounded base reaching 12·0 cm. long (or perhaps longer, as leaf material is not very complete). Bracts longer.

7. B. leiostegia Stapf in Journ. Linn. Soc. xxxvii. 92 (1905).
Hab. Upper Guinea. Liberia, Sinoe Basin, *Whyte* ! Herb. Kew.

*** Leaves ± 8-jugate. Leaflets chartaceous, glabrous, ovate-lanceolate, acuminate, shortly stalked, 9·0–11·0 cm. long, 4·0–4·2 cm. broad.

8. **B. Preussii,** sp. nov. Folia circ. 8 juga cum impari subsessili, rachios parte distali alata parte proxima exalata; foliolis glabris chartaceis oppositis vel passim alternis ovato-lanceolatis basi plus minus rotundatis apice acuminatis margine subintegris vel remote serrulatis nerviis lateralibus utrinque circa 12–14 tenuibus juxta marginem inter se anastomosantibus brevissime petiolulatis foliolis proximis quam distalibus paullo minoribus; pedunculis longis plus minus fusco-pubescentibus; racemo multifloro pedunculis longiusculis tenuibus strictis quam calyce longioribus; bracteis angustissimis pubescentibus longiusculis sepalis; 4 lanceolatis pubescentibus antico latiore apice bidentato; petalis dense canotomentosis petalorum lamina oblonga; staminibus 4 filamentis basi dilatatis duorum petalorum infimorum basi connatis longiusculis quam stylo longioribus superne glabris; stylo erecto superne fere glabro inferne pilis plus minus vestito, stigmate capitato tenuiter 4-lobo; ovario hirto 4-loculari.

Species *B. leiostegiæ* Stapf affinis differt foliolis ovato-lanceolatis haud oblongis, staminibus longioribus filamentis superne glabris, &c.

Hab. Upper Guinea. Cameroons, *Preuss*, no. 408 ! Herb. Mus. Brit.

Rachis in our specimen 33 cm. long. Proximal leaflets ± 9 cm.

long, ± 4 cm. broad. Distal leaflets ± 11 cm. long, ± 4·2 cm. broad. Calyx 8–9 mm. long. Petals ± 1·8–2·0 cm. long. Filaments of stamens 1·3–1·5 cm. long.

This plant was distributed as *B. paullinioides* Baker. It differs from this species in several important particulars. The leaflets are an entirely different shape, not so markedly attenuate to the base; the raceme is more copiously flowered and the filaments of the stamens longer.

**** Leaves ± 9-jugate. Leaflets papyraceous, base cuneate, ovate-oblong or obovate-oblong, glabrous, 15–18 cm. long, 5·0–5·8 cm. broad.

9. **B. Gossweileri**, sp. nov. Arbor e basi ramosa, ex cl. detectori. Folia circ. 9-juga; rachios parte distali alata parte proxima exalata; foliolis chartaceis glabris oblongo-obovatis margine integris basi cuneatis apice breviter apiculatis subsessilibus nerviis lateralibus utrinque circ. 12–14 juxta marginem inter se anastomosantibus foliolis terminalibus basi magis cuneatis; stipula intrapetiolari; racemo multifloro; bracteis angustissimis quam pedicello brevioribus; pedicellis inferioribus quam calyce longioribus; sepalis 4 externe tenuiter pubescentibus antico latiore apice bidentato; petalis 5 petalorum lamina oblonga ± carnosa ex cl. detectore pallide coccinea; disco semilunari-angulato; staminibus 4 vel 5 filamentis basi dilatatis, stylo subæquilongis; stylo erecto glabriusculo, stigmate capitato; ovario externe hirto 4-loculari vel rarius 5-loculari; capsula lignosa subsphærica leviter 4 vel 5 angulata extus molliter brunneo-tomentosa apice mucronata, spermis coccineis basi arillo flavo munitis.

Species *B. paullinioidi* Baker admodum affinis differt foliolis majoribus subsessilibus margine integris nerviis lateralibus multioribus, ovario nunc 4-loculari nunc 5-loculari, bracteis longioribus, &c., ab *B. leiostegia* Stapf foliolorum basi ± cuneato.

Hab. Lower Guinea. In the forests of Monte Bella, Angola, *Gossweiler*, no. 723! 723 B! Coll. Carp., Herb. Mus. Brit.; Herb. Kew.

Rachis reaching 50 cm. long. Terminal leaflet ± 16 cm. long, 5·5–6·0 cm. broad. Calyx ± 6 mm. long. Petals 1·6–1·7 cm. long. Filaments ± 1·0 cm. long.

The noticeable features of this plant are:—

α. The rather long rachis alate in the distal portion.

β. The papyraceous leaflets attenuate to both extremities, and subsessile with entire margins.

γ. The 4- or 5-celled ovary. The 4 or 5 stamens with filaments about as long as the style.

δ. The subspherical capsule slightly 4- or 5-angled.

"A palm-shaped tree stem branched from the base, branches erect, branchlets spreading, leaves irregularly imparipinnate, common petiole grooved on the upper surface towards the end decurrent, leaflets almost sessile, glossy on both sides, lower surface with reticulate venation in relief. Calyx 5-toothed deeply 2-lobed except the anterior. Corolla of 5 imbricate petals four times as

long as sepals, reflected over the calyx, partly fleshy pale scarlet with white margin, stamens 4 or 5, connate at the base, much exserted and quite erect. Style bent and protruding between the filaments, stigma globular, ribbed on ant. side surface. Ovary superior."—J. G.

***** Leaves 5–6-jugate. Leaflets oblong or ovate-oblong, base cuneate or cuneate rounded, glabrous 6·0–7·5 cm. long, ± 3·0 cm. broad.

10. **B. angolensis**, sp. nov. Arbuscula trunco recto crassitudine brachii, ramuli nodosi cicatricati erecti foliorum fasciculo-coronati secus cl. detectorem ; foliis 5–6-jugis, rachios parte distali tenuiter alata, parte proxima omnino exalata, foliolis tenuiter coriaceis oblongis vel oblongo-ovatis nerviis lateralibus sæpissime 11–12 margine integris vel serrato-dentatis supra læte viridibus parum lucidulis subtus pallide virescentibus, verniceo-nitentibus foliolis terminalibus subsessilibus basi insigniter cuneatis lateralibus basi cuneatis vel cuneato-rotundatis sæpissime 2–3-plo longioribus quam latis; stipulis intrapetiolaribus subacuminatis; racemo multifloro quam folio sæpe subduplo breviori ; bracteis angustissimis ; pedunculis pubescentibus inferioribus quam calyce longioribus ; calycis segmentis 4 apice obtusis ciliatis antico latiore apice breviter bifidis ; petalis lingulato-spathulatis villosulis flavescenti-viridiscentibus ; disco semiannulari 3-crenato ; staminibus 4 basi dilatatis duorum petalorum infimorum connatis ; stylo quam staminibus breviore, stigmate ovato-capitato verticaliter subcostato obtuso, ovario externe hirto 4-loculari.

Species *B. paullinioidi* Baker affinis differt ambitu foliolorum parum diversa, bracteis angustioribus et longioribus.

Hab. Lower Guinea. Angola. In the primitive forests of the mountains of Serra de Queta, Central Zengas do Golungo. Fl. Sept. 1855. *Welwitsch*, no. 1696 *b* ! Herb. Mus. Brit.

A small tree, ± 4 m. high. Rachis 12–18 cm. long, only winged in the 1–2 distal segments. Leaflets 6·0–7·5 cm. long, ± 3·0 cm. broad. Bracts 4–5 mm. long. Calyx ± 5 mm. long. Petals lingulate spathulate, ± 1·3 cm. long. The stigma in this plant is larger than in *B. Tysoniana* Oliver.

The leaflets are inclined to be oblong, not tapering so much to both extremities as in *B. paullinioides* Baker; the bracts are very much longer and narrower than those in the type from Sierra Leone.

Welwitsch no. 1695, from Golungo Alto, and no. 1696, from Queta, differ in their larger leaflets and entire margins.

****** Leaves 7–10-jugate. Leaflets oblong-lanceolate, glaucous above scattered hairs below, 10–14 cm. long, 4–5 cm. broad.

11. B. usambarica Gürke in Engler, Pflanzelwelt Ost Afr. C. 252 (1895) ; Pflanzenfamilien, iii. v. 380, t. 188, figs. F–K.

Hab. East Tropical Africa. Mlalo, *Holst*, no. 291. Lutindi, *Holst*, no. 3300 ! Kwa Mshusa, *Holst*, no. 9004 ! Upper Kondeland, Umuamba, Likabu-see, *Goetze*, no. 1321, *fide* Gürke.

******* Leaves 6–7-jugate. Leaflets sessile, oblong-elliptical or oblong, entire, with acute apices, reaching 20 cm. long and 6·0–7·2 cm. broad, but those with flowers smaller.

12. B. MAXIMA Baker, *l. c.* 434; Icones Pl. t. 2268 (1893).

Hab. UPPER GUINEA. Corisco Island, *Mann*, no. 1853! Herb. Kew.

******** Leaves 5–7-jugate. Leaflets oblong, glabrous above, sessile, 7·0–11·0 cm. long, 2·6–4·0 cm. broad.

13. **B. nyassæ,** sp. nov. Arbor foliis 5–7-jugis cum impari sessili; foliolis subcoriaceis oblongis apice acuminatis et mucronatis foliolis terminalibus anguste obovatis supra glabris et nitidis subtus primum pilis plus minus vestitis demum glabris costa superne impressa nervis lateralibus tenuibus arcuatis juxta marginem inter se anastomosantibus margine integris vel subundulatis foliolis lateralibus sessilibus; rachios parte distali alata parte proxima exalata et plus minus rufescenti-pubescenti; racemo multifloro apicem versus confertifloro quam foliis breviori; pedunculo striato; bracteis angustis pedicello subæquilongis rufescenti-pubescentibus; calyce extus ferrugineo-tomentoso sepalis 4 apice obtusis vel subacutis antico latiore statu fructescenti reflexis; petalorum lamina oblonga ungue sericeo-albida; disco semiannulari lobato; staminibus 4 vel 5 filamentis basi dilatatis; stigmate capitato globoso; stylo superne glabro inferne pilis tecto; capsulis lignosis 5-valviis spermis arillo cupuliformi crassiusculo munitis, testa corrugata.

Arbor *B. maximæ* Bak. affinis differt staminibus interdum 5, pedicellis brevioribus, calyce longiori et mollissime subferrugineo-tomentoso.

Hab. BRITISH CENTRAL AFRICA. Nyassaland, *Buchanan*, no. 280! (1895); Herb. Mus. Brit.

A plant collected by Mr. Scott Elliot in the Shire, no. 8582, is very closely allied to the above.

The following plants which I have seen in Herb. Kew. probably also belong here:—Mt. Zomba, *Sir H. H. Johnston*, no. 97! *Buchanan*, no. 218! Namasi, *K. J. Cameron*, no. 9!

Leaflets 7·0–11·0 cm. long, 2·6–4·0 cm. broad. Raceme with peduncle in specimen 28 cm. long. Petals ± 14 mm. long. Anthers ± 4 mm. long. Capsule ± 3 cm. long. Seed ± 7 mm. in diameter. Aril cupuliform, yellowish.

********* Leaves 7–8-jugate. Distal leaflets oblong ovate-oblong, proximal ovate, subsessile, 5·0–9·0–13·0 cm. long, 3·5–4·5 cm. broad.

14. B. UGANDENSIS Sprague in Journ. Linn. Soc. xxxvii. 512 (1906).

Hab. UGANDA PROTECTORATE. Koki District, *Dawe*, no. 382! Herb. Kew.

Var. nov. **serrata.** Arbor, foliolis distalibus oblongis in parte $\frac{3}{5}$ superiore margine argute serratis subtus cinereo tomentosis foliolis proximis ovatis omnibus subsessilibus; calycis segmentis 4 anguste

ovatis subacuminatis antico latiore bifido; petalis quam iis typi brevioribus; staminibus 4 antheris hirtis; stylo erecto superne glabro; stigmate globoso leviter 4-lobo; ovario pilis albidis vestito 4-loculari.

Hab. Uganda Protectorate. Ruchigga, *Bagshawe*, no. 398! Herb. Mus. Brit.

"Tree with white flowers."

Leaflets proximal 5·0–7·0 cm. long, distal 9·0–13·0 cm. long, 3·5–4·5 cm. broad. Calyx ± 5 mm. long. Petals ± 1·2 cm. long.

B. Stamens 5.

α. Leaf rachis generally unwinged (in *B. abyssinica* Fres. occasionally winged in the distal portion).

* Leaves with usually 4 pairs, 3–7–9, of slightly stalked, oblong-lanceolate leaflets generally 7–9·0 cm. long and 2·5–3·5 cm. broad.

15. B. abyssinica Fres. in Mus. Senckenb. ii. 281, t. 17; Baker in Fl. Trop. Afr. i. 434; Engler, Hochgebirgsflora, 293.

B. integrifolia Richard, Fl. Abyss. i. 107 (1847).

Hab. Nile Land. Abyssinia, *Ruppell*! *Schimper*, no. 1507! Scholoda, *Schimper*, ii. no. 942! Amba-Sea and Gayeh-Merki, *Schimper* (1862), no. 912! Gondar, *Steudner*, no. 1268. Ghabah in Simen, *Steudner*, no. 1365. Uganda Protectorate. Toro east, alt. 4200 ft., *Bagshawe*, no. 1113! Mpanga river, alt. 3500 ft., *Bagshawe*, no. 1055!

Planchon considers *B. integrifolia* Rich. synonymous with *B. abyssinica* Fres., but retains *B. serrata* Rich. as distinct; in Fl. Trop. Afr. both are placed under *abyssinica*.

** Leaves ± 7-jugate. Leaflets oblong-lanceolate, glabrous, margin entire, apex mucronate, 5·0–13·5 cm. long, 2–4·0 cm. broad. Petiolule of terminal leaflets 1 cm. long.

16. B. Holstii Gürke in Bot. Jahrb. xix. Beibl. 47, 35 (1894).

Hab. East Tropical Africa. Usambara, near Mlalo, *Holst*, no. 2432!

Bagshawe, no. 379, from Kitara, Koki, is doubtfully placed here, as the flowers are not sufficiently developed.

*** Leaves 6–7-jugate. Leaflets oblong-lanceolate, apex acuminate, glabrous, towards apex serrate 8·0–10·0 cm. long, 3·0–4·5 cm. broad.

17. B. Volkensii Gürke in Bot. Jahrb. *l.c.* 36 (1894).

Hab. East Tropical Africa. Kilimanjaro, *Volkens*, no. 1252*a*.

**** Leaves 5–7-jugate. Leaflets shortly stalked, oblong-ovate, apex acute or acuminate, margin entire, glabrous, 3·0–6·0 cm. long, 15–25 mm. broad.

18. B. Goetzei Gürke in Bot. Jahrb. xxviii. 424 (1900).

Hab. East Tropical Africa. Uhehe, Mantanana Plateau, *Goetze*, no. 744. Kinga Hills, Ussangu, *Goetze*, no. 1275.

β. Leaf rachis winged.

* Leaves 5–10-jugate. Leaflets ovate or oblong-lanceolate, thinly coriaceous, 6·0–12·5 cm. long, 1·2–5·0 cm. broad.

19. B. ANDONGENSIS Hiern, Cat. Welw. Afr. Pl. i. 174 (1896).

Hab. LOWER GUINEA. Angola. In secondary thickets near Luxillo, Pungo Andongo, *Welwitsch*, no. 1698 !

Var. nov. **ugandensis.** Arbor parva; foliis ± 9-jugis cum impari sessili jugis proximis quam distalibus multo minoribus foliolis oblongis acuminatis subtus ad nervos pilis sparse vestitis, rachios parte distali quam typo magis alata; racemo multifloro; pedunculis quam iis typi brevioribus; floribus majoribus; calyce extus griseo-lutescenti-sericeo; petalis 5 oblongo-spathulatis; staminibus 5 basi dilatatis.

Hab. UGANDA PROTECTORATE. Toro, near Mpanga river, *Bagshawe*, no. 1074 ! alt. 4000 ft.

"Tree with white flowers in vertical inflorescences." Herb. Mus. Brit.

Leaves 20–35 cm. long. Leaflets proximal ± 5·5 cm. long, distal ± 13 cm. long, ± 4 cm. broad. Calyx ± 8 mm. long. Petals ± 17 mm. long, ± 4 mm. broad. Anthers ± 3·5 mm. long. Stigma globose.

** Leaves 7–10-jugate. Leaflets oblong-lanceolate acuminate, 6·0–9·0 cm. long, 2·0–2·5 cm. broad.

20. B. ENGLERIANA Gürke in Bot. Jahrb. xiv. 307, t. v. (1891).

B. Engleri Gürke MS. ex Engler, Hochgebirgsflora, 293.

Hab. EAST AFRICA. *Fischer*, no. 135.

A specimen of a tree, 20 ft. high, collected by *Scott Elliot* on the Nandi Hills, no. 7027, is clearly allied to the above, but differs somewhat in the stipules.

PLANTAGO LANCEOLATA L. VAR. *SPHÆROSTACHYA* ROHL.

RECENTLY in going over the proof-sheets of my *History of the Dillenian Herbaria* my attention was again directed to the plantain referred by Mr. C. E. Salmon, in his paper in this Journal (1906, 126), to the above name. This may, as Mr. Salmon suggests, be the plant referred to by Linnæus (*Species Plantarum*, 114) as "*β* Plantago trinervia, folio angustissimo Bauh. Pin. 189, prod. 98"; but is it the plant of Ray, with which Mr. Salmon also identifies it, referred to in the *Synopsis*, ed. i. p. 126, n. 7 (1690), as "Plantago an Alpina angustifolia J. B.? Narrow-leaved Mountain-Plantain. In rupibus Trigvylchau supra lacum Llyn Bochlyn prope Ecclesiam S. Perisii. D. Lloyd"? I think not.

Ray places the plant after *P. maritima* and *P. Coronopus*. Dr. Richardson, who visited this spot with Lloyd, with whom he was also in frequent correspondence, says, in a letter to Sherard dated April 1st, 1726 (see Richardson, *Correspondence*, p. 239), "At the

top of the Glyder are Trigvulcaugh rocks; on the north side of which, growing out of the clifts of the steep rocks, you'll find the *Plantago minor angustifolia* J. B.: this seems to me a distinct plant from the marine one; the leaves are shorter, narrower, and more rigid; the spikes shorter. I have kept it in my garden ever since I was in Wales with Mr. Lloyd, and it never varies: that from the bishoprick of Durham, and also from Northumberland, is no other than the marine one. I have this also in my garden." This description appears fairly conclusive as to the plant being allied to *P. maritima*; but we have further evidence. In the third edition of Ray's *Synopsis* (p. 315), Dillenius adds to the original name, "Plantam hanc e rupibus *Trigvylcaugh* orientem spectantibus in hortum intuli, ubi jam viret; *D. Richardson*. Plantagini marinæ Ger. tam similis est ut distingui nequeat. Spica saltem gracilior est, quod loci conditioni procul dubio debetur": and in his herbarium are plants sent by Dr. Richardson from Durham and Northumberland labelled, "sane non differt a *maritima*"; and also two specimens gathered on "Sept. 1727, on Trigvylchau Rocks by Mr. Brewer"—the latter are very narrow-leaved forms of *P. maritima*, not *P. lanceolata*. In a letter of Dr. Richardson to Dillenius, Oct. 25th, 1726, he says he wishes Dillenius had been on "the high rock Trigvylchy, which is at the very top of the Glydyr . . . that you might have gathered *an Plantago alpina angustifolia*? J. B. of Mr. Lhwyd then in flower"; he repeats the observations about it which he made to Sherard, and adds that it has remained constant in its characters in his garden. Therefore we may without doubt identify this plant of Ray as a variety of *P. maritima*.

P. lanceolata var. *sphærostachya* is represented in the Dillenian *Synopsis*; being one of the new species added by Dillenius, it stands next to *P. lanceolata* on p. 315, n. 6, as *Plantago angustifolia minor* Tab. Ic. 732. His herbarium specimens are from "pratis Insulæ Selsey non procul a maris littore copiose Junio," and from "Llanberris in saxosis folia glabra; Elthami in vulgarem transiit," which suggests that it is rather a state than a variety. The fact that both plants occurred near Llanberis may have misled Banks, but I think I remember seeing *sphærostachya* also on the Glydyr. S. F. Gray (*Nat. Arr. Brit. Pl.* ii. p. 293) puts the latter plant as var. *trinervium* of *P. lanceolata* (his *Arnoglossum lanceolatum*), characterized by its "leaves narrow, 3-ribbed"; while the former plant is wrongly identified with *P. alpinum* L., a plant unknown in Britain, and practically limited to Central Europe.

G. Claridge Druce.

When I read Mr. Druce's note, and in its light reperused Mr. Salmon's paper, it seemed to me that the suggestion that *both* plants were found in the Llanberis locality was the solution of the matter. I wonder now that it did not strike either Mr. Salmon or myself when we read his paper in proof that the variety *sphærostachya* did not correspond with Dillenius's remark, "Plantagini marinæ *Ger.* tam similis est ut distingui nequeat"; although it

entirely agrees with Hudson's diagnosis—" P. foliis lineari-lanceolatis basi lanatis, spica subrotunda, scapo tereti "—of what he considered to be Ray's plant. I regret it did not occur to me, when Mr. Salmon was working at his paper in the National Herbarium, to see whether Buddle's Herbarium threw any light on the matter, but the possibility of two plants being in question occurred to neither of us. I have now consulted Buddle and the result confirms this view.

On folio 33 of vol. x of his Herbarium Britannicum (Herb. Sloane cxxiii) are two small Plantains, labelled respectively :—

" Plantago an angustifolia J. B. Lhwyd R. Syn. [ed. 2] 185 a D. Richardson collect. in eodem loco ibi notato, est potius Coronopus sive serpentina minima Ger. 425."

" An Plantago Alpina Angust. J. B. et Lhwyd R. Syn. 185. Plantago vero D. Lhwyd nihil est nisi quinquenervia secundum D. Richardson. An Plantago angustifolia minor Tab. 732."

The first of these is certainly *P. maritima*; it is not, however, the plant figured by Gerard [ed. Johnson] on p. 425. The second is the plant which forms the main subject of Mr. Salmon's note. The figure of Tabernæmontanus cited is a small form of *P. lanceolata* and may quite well be the var. *sphærostachya*. A later hand has added to the note in Herb. Buddle a reference to Ray's *Historia Plantarum*, 878 (1686); here the plant is placed next to *P. lanceolata*, and is called " Plantago angustifolia minor C. B. Park. quinquenervia minor Ger." Ray's description runs: " Parvitate sola omnium partium à præcedente differt. Qu. annon loco natali debeatur hæc diversitas." Gerard in 1597 reproduces Tabernæmontanus's figure (p. 339), but places it as a variety of *P. media*; in the later edition of the *Herball*, Johnson suppresses the figure, doubtless seeing it had nothing to do with *media*, but leaves Gerard's brief description, and adds under *P. lanceolata* a note—" There is another lesse kinde of this Rib-wort, which differs not from the last mentioned in anything but the smallnesse thereof."

It may I think still be argued that Ray's original plant, of which no description was given, was the form of *P. lanceolata* which Mr. Salmon identifies with *sphærostachya*; this latter was certainly, so far as the diagnosis goes, the *montana* of Hudson in the first edition of his *Flora Anglica* (p. 65). In his second edition, however, Hudson suppresses *montana* and places the Llanberis plant which he had referred to it under *maritima*. The labelling by Banks in his herbarium of one of his Welsh specimens of *sphærocephala* " Plantago montana Huds. lanceolata β Linn." shows that Banks had identified his plant with Hudson's description, but had referred it correctly to Linnæus's variety of *P. lanceolata*. Is it worth a distinctive name ?

JAMES BRITTEN.

NOTES ON *LIMONIUM*.*

By C. E. Salmon, F.L.S.

V. — Limonium binervosum.

It is with feelings of regret, and yet of satisfaction, that I place the above name before British botanists to supersede that given in this Journal for 1903, 72, as *L. occidentale*; regret that the Rules of the Vienna Congress should cause another change, and satisfaction that it has become possible to utilize for all time a name that recalls the memory of that accurate British botanist, G. E. Smith. An excellent account of the present plant appeared in Eng. Bot. Supp. t. 2663 (1831), from the pen of this observer, under the name *Statice binervosa*, which antedates Lloyd's *S. occidentalis* by thirteen years.

The corrected synonymy will stand as:—

Limonium binervosum.

Statice cordata G. E. Sm.! Cat. Pl. South Kent, 18, t. 2 (1829) (non al.).

S. spathulata Hooker! Brit. Fl., 145 (1830) (pro parte, non al.).

S. binervosa G. E. Sm.! in Eng. Bot. Supp. t. 2663 (1831).

S. Bayonnensis Grenier, pl. exs. (1836)! et ex DC. Prodr. xii. 649 (1848).

S. occidentalis Lloyd! Fl. Loire-Inf. 212 (1844).

S. Bubanii Girard! in Ann. Sci. Nat. Sér. 3, ii. 326 (1844).

S. Dodartii Bab.! Man. Brit. Bot. ed. 3 and 4 (non Gir.).

S. binervosa G. E. Sm. *β intermedia* Syme!, Eng. Bot. ed. 3, vii. 164 (1867) (pro parte).

Limonium occidentale O. Kuntze, Rev. Gen. ii. 395 (1891).

Exsicc. — J. Lange, Plant. Europ. Austral. 1851–52, 195! Reliq. Maill. 1614! F. Schultz, Herb. Norm. nov. ser. cent. 1, 134! Billot, Fl. Gall. et Germ. 2350! Soc. Dauphin, 1882, 3433! Magnier, Fl. Select. 2040! Dörfler, Herb. Norm. 4173! F. Schultz, Herb. Norm. cent. 12, 1128!

The locality for this species in v.-c. 2 *Cornwall East* (Journ. Bot. 1903, 72), should be erased, as Mr. F. H. Davey tells me that Perranzabuloe Porth is in West Cornwall. The earliest record that I have noted for v.-c. 2 dates from 1839, in Herb. Borrer, with the locality, Tintagel Castle Island!

L. binervosum certainly occurs in Ireland in the counties of Wexford, Louth, Donegal, and Meath, besides those mentioned in my previous article (p. 78).

L. binervosum var. procerum.

Statice binervosa G. E. Sm., *β intermedia* Syme, Eng. Bot. ed. 3, vii. 164 (1867), pro parte.

L. occidentale O. Kuntze var. *procerum* mihi, in Journ. Bot. 1903, 78.

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* See Journ. Bot. 1903, 65; 1904, 361; 1905, 5.

I have examined examples of this variety from v.-c. 5 *Somerset North*, Birnbeck Island, Weston-super-Mare! 1896, D. Fry (Herb. J. W. White), v.-c. 52 *Anglesey*, Red Wharf Bay! 1858, S. H. Bickham, and from *Dublin*, Sutton side of Howth! 1868, ex herb. H. G. Carroll (Herb. Dublin); these plants have a slightly different aspect from the Ormes Head specimens.

L. BINERVOSUM var. HUMILIS.

Statice reticulata Hooker! Fl. Scotica, 97 (1821) (non al.).
S. spathulata Hooker! Brit. Fl. 145 (1830) (pro parte, non al.).
S. Dodartii Gir. var. *humilis* Gir. in Ann. Sc. Nat. Sér. 2, xvii. 33 (1842).

This is the plant referred to in Journ. Bot. 1903, 73, which may now be distinguished by the above name; the following characters serve to keep it apart from typical *S. binervosum*, omitting characteristics common to both.

Plant varying in height from 2–3 inches (the *humilis* of Girard) to 10–15 inches. *Leaves*, recalling in shape those of *L. recurvum*, always *small*, *narrow and long-petioled*, with petiole as long as or longer than blade, oblanceolate-spathulate or more oblong, usually obtusely-pointed or rounded and not apiculate, 1–3-veined; in small specimens, $\frac{1}{2}$ inch long and $\frac{1}{8}$ inch wide, in large 1–1$\frac{1}{2}$ inches long and usually less than $\frac{1}{4}$ inch wide. *Scape* slender, rather smooth, hardly tapering, erect or occasionally arcuate, branched from quite near base with a good many barren branches (rarely none). *Branches* and *branchlets* usually erect. *Spikes* distant, erect, rather long, narrow and loose-flowered (in small specimens, shorter, broader and more spreading and close together in a terminal corymb). *Spikelets* arranged rather laxly (more closely in small specimens), 2–3-flowered. *Outer bract* 1$\frac{1}{2}$–1$\frac{3}{4}$ lines long and *apparently always green* and not tinged with purple; shape, &c., as in *binervosum*, but *longer in proportion to inner bract* than in that species. *Middle bract* 1$\frac{1}{2}$ lines long, otherwise as in *binervosum*. *Inner bract* 2$\frac{1}{2}$–2$\frac{3}{4}$ lines long, *coloured as outer bract*, and more *elliptical-ovate* than the obovate shape in *binerrosum*.

In accordance with the Vienna rulings, Girard's name *humilis* must stand for this variety; it is an unfortunate one for a plant attaining a foot or more in height, but Girard only saw examples 2–3 inches high. Moreover, he placed the variety under his *S. Dodartii*, a species I have not yet seen from any part of Britain.

So far, I have failed to find this variety amongst some hundreds of examples of *L. binervosum* from various localities in England, Wales, Ireland and the Continent, so at present it seems known only from Scotland.

The variety may be known at a glance by its small, narrow, long-petioled leaves and long, narrow, erect spikes, and, on closer inspection, by its outer and inner bract characters.

Distribution.—74. *Wigtown.* Mull of Galloway! 1823. *Goldie* (Herb. Kew); still existing there in one small patch.—*83. *Edinburgh.* Near Cramond! 1842. *G. W. Moyle* (Herb. W. Moyle Rogers); said to be now lost.

THE NEW RULES FOR NOMENCLATURE.

Our readers are now in possession of the Rules for Nomenclature adopted by the International Botanical Congress at Vienna in 1905, which were issued as a Supplement to last year's Journal and may be obtained separately as a shilling pamphlet, and will thus be enabled to see for themselves the verdict upon the discussions which have been for some years past carried on in this Journal and elsewhere. Whatever opinion may be formed as to details, it is, as we have already said, desirable in the interests of uniformity and convenience that these Rules should be implicitly followed. The conclusions as a whole are eminently sane and reasonable—the ridiculous claim of "priority of place" and the duplication of names in the style of *Linaria Linaria* are ruled out of court, and the foolish distinction by which the adjectival form of the name of a person is spelt with a small letter while its substantive form has a capital is set on one side. The greatest possible care has been taken in defining the Rules and their application, and although the "recommendations" have presumably not the same binding force as the Rules themselves, we think that they will be generally accepted. The use of carefully chosen "examples" helps to the ready understanding of the Rules in their application.

The most important decision is that which asserts the supremacy of the earliest specific name, no matter under what genus it may have been used. In this Journal we have always maintained that the earliest combination under the accepted genus should be adopted, and as a matter of opinion we still consider that the more reasonable and satisfactory mode of procedure. But the great thing is to arrive at finality, and this can be done by the rule adopted. This will of course lead to numerous changes which must for a time cause inconvenience; but the fact that, this done satisfactorily, the names arrived at will be permanently fixed, will compensate for this.

A less satisfactory feature of the Rules—indeed, the only one to which serious exception can be taken—is the adoption and authorization of the "Index nominum genericorum utique conservandum" which was appended to the draft copy sent round for discussion before the Conference took place; the published account of the discussion regarding it shows that a considerable minority—37 as against 118—objected to its adoption. We entirely agree with Mr. Coville that this decision is the weakest taken by the Congress; a very slight investigation shows that the list is far from complete, and it is open to future Congresses to extend it. We have always protested against the arbitrary closure proposed in various forms by German botanists as being an infringement of the law of priority which in our judgement should alone govern nomenclature, and we fail to see what gain can result from the adoption of the Harms list, if it is to be regarded as capable of indefinite extension in the future. We think that, as the list has been adopted, it should be

accepted and acted upon; but we trust that any extension of it in the future will be strongly resented, in the interest of that stability which we observe one of the speakers considered would result from its adoption. Owing to the incompleteness of the list, the perverted ingenuity which has added so many useless synonyms to our nomenclature will still have scope for its exercise; and the honest worker himself will often be compelled by the force of logic to restore names which he would willingly overlook, for, by the wording of the Rules, all names not definitely excluded are available. Moreover, a considerable number of restorations, which would certainly be on the list had the compiler been aware of them, will maintain their position owing to their exclusion from it; thus, among British plants, *Radicula* of Hill, adopted by Messrs. Groves in their edition of Babington's *Manual* for *Nasturtium* Br., will remain, although *Cammarum* of the same author is barred by the list; and *Trichoon* of Roth (1798), taken up by Dr. Rendle (Cat. Pl. Welwitsch, ii. 218), must replace *Phragmites* Trin. (1820).* This list of course will not greatly affect British botanists, for whose convenience we have appended to the Rules a list of those genera as appearing in British books which will be affected by the Index. To this list must be added *Peramium*, which Messrs. Groves, following some American authors, substitute for *Goodyera*; this is invalidated by the fact that Salisbury published the name without any diagnosis.

It is to be hoped that any necessary changes will be effected with all possible care, and without that haste for the creation of new combinations to bear the name of their manufacturer which has hitherto been somewhat too prominent in work of this kind. Mr. Druce, with characteristic energy and ingenuity, has at once set to work, and has published in the *Annals of Scottish Natural History* for October a list of changes which he considers "may have the advantage of directing attention to the subject, and will allow the suggested names to be subjected to criticism." It seems to us that the "advantage" hardly compensates for the unwisdom of "suggesting names to be subjected to criticism"; criticism should surely precede publication, or the latter will only add to the numberless unnecessary synonyms already in existence. This indeed is to some extent the case with Mr. Druce's list; in his anxiety to secure new combinations he has not waited for the official publication of the new Laws and thus takes up names of genera which the Laws exclude; he even pursues this manufacture into synonymy! Nor do we see what is gained by rushing out what is manifestly only a small portion of the changes that will be necessary. There are undoubtedly in Mr. Druce's list names which will have to be taken up; but there are others which must pass at once into the lumber of useless synonymy.

We have no intention of entering into a detailed criticism of this first attempt to revise the nomenclature of some British plants; but we may deduce from it one or two conclusions of general

* The name of the British plant is *T. Phragmites* Rendle, *l. c.*

application, which we commend to the notice of others who take up the work. The first is that quotations should be verified: where this is not possible, it should be stated. Mr. Druce, for example, relies far too much upon Richter's *Plantæ Europeæ*—a most useful compendium of synonyms, so far as the names go, but extraordinarily inaccurate in the matter of citations and dates. Folk never seem to realize that identity in blundering almost always betrays the source of the blunder. Thus Mr. Druce cites "*Mibora minima* Desv., Fl. d'Anj. 46, 1827"; this he takes bodily from Richter (the *Index Kewensis* has a similar reference, but without the date), but in this case title, page, and date are wrong, as any one can see who will take the trouble to look the matter up—the reference is to the *Observations sur les plantes des environs d'Angers*, p. 45, published at Angers and Paris in 1818. It may be said that those who have not access to a first-rate botanical library cannot check references satisfactorily; but is there any reason why such folk should enter on the tangled path of synonymy? Moreover Mr. Druce is a man of leisure, and the libraries of London are easy of access.

Again, the botanical side of the work of correction must not be neglected. On the faith of Richter's synonymy, Mr. Druce invents a new combination—*Festuca membranacea*—for the plant which is generally known as *F. uniglumis* Soland.; but Duval-Jouve (in Rev. Sci. Nat. ii. 34 (1880)) makes it clear that, whatever *Stipa membranacea* of Linnæus may have been, it is not synonymous with *F. uniglumis*. Nor do we think *Hordeum bulbosum* L., by which Mr. Druce would replace *H. secalinum* Schreb., is a synonym of that plant.

We would enter a protest against the practice which seems creeping in of quoting the *Index Kewensis* as if it were a botanical authority. The absence of any introduction to that invaluable work is to some extent accountable for the apparent misunderstanding as to its object, which is that of an index and nothing more; the entries—*e. g.* "Habenaria *chloroleuca* Ridl. = bifolia"—do not imply that Mr. Jackson has critically investigated the botany of the matter, but only that some recognized authority—a monographer or other—has made the reduction. Mr. Druce cites names—e.g. *Galeopsis ochroleuca*—as "Lam., Ency. ii. 600, 1780 and Index Kew."; but the addition of the *Index* adds nothing to the history of the plant or to the value of the citation.

It may be added here that a list of British species, drawn up in accordance with the new Laws by Dr. Rendle and Mr. Britten, will be published very shortly by the Trustees of the British Museum. This will be so arranged as to show the synonymy in Messrs. Groves's edition of Babington's *Manual*, in Hooker's *Student's Flora*, and in Bentham's *Handbook*. It will be a satisfaction to many to know that in this the new combinations necessitated by the Laws will be very few, the changes from the more accepted nomenclature being for the most part a return to that which was familiar twenty or thirty years back, before the recognition of the earliest name under the genus had become general.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1905.

By A. B. Rendle, D.Sc.

The following additions have been made to the collections by presentation:—170 phanerogams and 80 cryptogams from Malaya, from H. N. Ridley; 48 phanerogams from the Shan States, from Major C. H. Melville; 4 phanerogams from India, from Dr. T. Cooke; 45 phanerogams and 20 cryptogams from Hong-kong, from S. T. Dunn; 188 phanerogams from Eastern Mongolia, from C. W. Campbell; 1954 phanerogams and 136 cryptogams from Western China, collected by E. H. Wilson, from Messrs. Veitch; 69 phanerogams from Rhodesia, from E. R. Sawer; 21 phanerogams from Northern Nigeria, from Dr. Karl W. Kumm; 3 specimens of Convolvulaceæ from Northern Nigeria, from Capt. G. B. Gosling; 122 phanerogams and 8 cryptogams from Angola, from J. Gossweiler; 153 phanerogams and 3 cryptogams from the Transvaal, from J. Burtt Davy; 106 phanerogams from the Uganda Protectorate, from Dr. A. G. Bagshawe; 3 specimens of Compositæ from South Africa, from Dr. H. Bolus; 4 specimens of Coniferæ from Mexico, from George Shaw; 11 specimens of violets from the United States, from Homer D. Howse; 6 phanerogams from California, from Dr. Davidson; 24 specimens of *Sarracenia* from Dr. J. M. McFarlane, Philadelphia; 249 phanerogams and 17 cryptogams, collected in Mexico, 1827–9, by G. J. Graham, from Mrs. Howgrave Graham; 36 specimens of Podostemaceæ from A. W. Bartlett; 401 phanerogams and 17 cryptogams from Chili, from G. F. Scott Elliot; 7 flowering plants and 13 cryptogams from Tierra del Fuego, from Capt. Crawshay; 41 phanerogams and 13 cryptogams from the Falkland Islands, from Mrs. Vallentin; 5 specimens of *Azalea* critically determined, from Herr J. Valckenier Suringar; specimens of cultivated plants from A. Perry, James O'Brien, Walter Ledger, and E. A. Bowles; a section of yew from the Red Bog, near Ballyfin, Queens Co., Ireland, from R. D. Cole; a leaf of *Ceratozamia mexicana* and a specimen of *Ecballium Elaterium* for exhibition, from the Director, Royal Gardens, Kew; and 7 specimens of Characeæ for exhibition, from H. and J. Groves; 100 ferns from the South Sea Islands and New Zealand, from Commander G. G. Webber; 3 ferns from the Pyrenees, from C. E. Salmon; 37 mosses from Fernando Po, from W. S. Sherrin; 13 mosses from the Swedish Antarctic Expedition, from M. J. Cardot; 24 hepatics from Jamaica, from Alexander W. Evans; 4 new marine algæ from the Faröe Islands and Norway, from H. G. Simmons; 24 tubes of freshwater algæ, collected by I. H. Burkill, from Lt.-Col. D. Prain; photographs of 7 types of Japanese Sargassa in Herb. Harvey from Dr. E. Perceval Wright; 33 lichens from Bombay, from Rev. E. Blatter; one or two specimens from Sir Daniel Morris, Miss Copland, J. W. Odell, F. Garry, Lieut. Rayner Cole, Franklin White, Dr. Britton, Dr. Morrison, Rev. R. P. Murray, W. Fawcett, Rev. J. Gerard, C. Kerr Wilson, Miss Anna Vickers, and J. T. Bennett-Poë; a drawing of a group of plants by

J. van Huysum, from F. Justen; and a large photograph of *Phalænopsis Schilleriana* for exhibition, from the Hon. Walter Rothschild.

The additions to the British Herbarium by presentation have been:—90 specimens from C. E. Salmon; 160 specimens from Rev. E. S. Marshall; photograph of wild cherry tree showing "witches' broom," from Jas. Saunders; 34 specimens from Rev. H. J. Riddelsdell; a large collection of Rubi collected by the Revs. W. H. Purchas and A. Ley, from Rev. A. Ley; 3 specimens from Miss E. Armitage; 23 specimens from G. C. Druce; 28 specimens from A. Bennett; 3 specimens from J. C. Melvill; 4 specimens of willows from Rev. E. F. Linton; 5 cryptogams from T. E. Belcher; 9 rare Hepaticæ from Symers M. Macvicar; 3 fungi and 2 books of manuscript descriptions of British Tuberoideæ and Discomycetes, from Worthington G. Smith; large specimens of *Laminaria* from Loch Eil, from Henry A. Hammond; and large specimens from the Scilly Isles, from C. B. Maggs and R. H. Bunting; about 700 marine algæ, mostly from the west coast of Scotland, from Monsignor Canon Bernard Ward; and single or two specimens from Prof. D. Oliver, Mrs. Gregory, W. P. Hiern, C. T. Green, H. W. Pugsley, E. Holland, Dr. C. B. Plowright, and Canon H. W. Lett.

The following additions have been made by exchange of duplicates:—487 specimens from South America and Mexico, and specimens of African Acanthaceæ, from the Royal Botanic Museum, Berlin, through Dr. Engler; 2333 phanerogams and 227 cryptogams of the Philippine Islands, from the Bureau of Government Laboratories, Manila, through Prof. Elmer D. Merrill; 137 specimens from Brazil, collected by Malme, from the Botanic Garden of the Royal Academy of Science, Stockholm, through Prof. Wittrock; 127 phanerogams and 9 cryptogams, chiefly collected by R. Schlechter in South Africa, from the Botanic Museum, Zurich, through Prof. Hans Schinz; Kryptogamæ Exsiccatæ, Cent. x, xi, from the Vienna Hofmuseum; 123 specimens, mainly orchids, from New Guinea, from Dr. R. Schlechter; 64 New Zealand mosses, from T. W. Naylor Beckett; 138 mosses and hepatics of Brazil, from Dr. C. A. M. Lindman.

The principal purchases during the year were:—1273 phanerogams and 39 cryptogams from Paraguay, from Dr. Hassler; 881 phanerogams and 84 cryptogams from Japan, Corea, and Formosa, from Rev. Urban Faurie; 200 phanerogams and 17 cryptogams from Siam, collected by Dr. Hosseus, from Dr. Wilms; 176 phanerogams and 21 cryptogams, "Iter Persicum alterum, 1902," from J. Bornmüller; 537 South African plants collected by R. Schlechter, from Dr. Loesener; 590 specimens from Cameroons collected by G. Zenker, from Dr. E. Gilg; 445 phanerogams and 73 cryptogams from British Columbia, from C. H. Shaw; 800 specimens from South California, from L. R. Abrams; 460 specimens from North Mexico, from G. B. Metcalfe; Herb. Normale, Cent. xliv., from Dörfler; Flora Stiriaca exsiccata, Cent. i., from Hayek; 117 specimens Herb. Dendrologicum (Fascicle v.), from Koehne; 82 specimens Carices Exsiccatæ (Fascicles xii.–xii. A) and

Gramineæ Exsiccatæ (Fascicles xvii., xviii.), from Kneucker; 25 British Hieracia (Fascicle vii.), from Rev. W. R. Linton.

125 cryptogams of Germany, Austria, and Switzerland, from Migula; 160 Muscineæ of Cardiganshire, from Painter; 50 mosses of the Malay Archipelago, from Fleischer; 200 European Hepaticæ, from Schiffner; 58 mosses and 136 fungi of Brazil, from Ule; 75 North American algæ, from Collins, Holden, and Setchell; 250 fungi imperfecti, from Kabát and Bubák; 20 Ohio fungi, from Kellerman; 14 microscope preparations of micro-fungi, from Miss A. L. Smith; 150 micro-fungi, from Vestergren; 50 fungi selecti, from Jaap; 50 Ascomycetes, from Rehm; 100 European fungi, from Rabenhorst, Winter, and Pazschke; 50 economic fungi, from Seymour and Earle; 150 fungi of Germany, 50 Uredineæ, 50 Phycomycetes and Protomycetes, from Sydow; 150 cryptogams of South Africa, from Wilms; 400 North American fungi, from Bartholomew, Ellis, and Everhart; 100 Saxon fungi, from Krieger; 25 parasitic fungi, from Briosi and Cavara; 3 exhibition sheets of water-colour drawings, from Worthington G. Smith; 30 water-colour drawings of British lichens for exhibition, from Highley.

Among the additions acquired by purchase, special reference may be made to 12 MS. volumes containing a classified series of annotated descriptions of the genera and species of British Basidiomycetes, prepared by Mr. Worthington G. Smith, and illustrated with 135 ink drawings exhibiting the characters of the genera and subgenera. More than 2150 species are described, thus affording a valuable supplement to the fine series of coloured drawings in the Department.

THRINCIA NUDICAULIS.

By James Britten, F.L.S.

In his *Prodromus Floræ Britannicæ*, p. 70, Mr. Williams substitutes for the generally received *Leontodon hirtum* of British books the name *L. Leysseri* Beck, in this following the distinguished Austrian botanist in considering *L. hirtum* of Linnæus to be a different plant. In the course of his disquisition Mr. Williams has a bibliographical note which may mislead future workers and which it may therefore be well to correct, especially as the correction materially affects the right naming of the species.

Mr. Williams says "In the copy of Sp. Plantarum ed. 2 in Herb. Mus. Brit., annotated by Solander, he has written opposite the description of *L. hirtum* 'Hab. ad Petersfield Angliæ, in Madera, Lincolnshire—*nudicaule*,' thus throwing doubt on the application of the Linnean name to the English plant. The specimen so labelled is in Herb. Banks."

In the first place it may be pointed out that Mr. Williams means the 1st edition, not the 2nd, and that the only MS. entry is the name *Leontodon hirtum* written by Dryander (not Solander) in

the margin opposite *Crepis nudicaulis*, which in ed. 2 was placed under *L. hirtum* (there first published) as a synonym. The MS. locality quoted by Mr. Williams appears, not in Sp. Pl. but in the notes on the plant described in Solander's MSS. as *L. nudicaule* : it runs "Habitat ad Petersfield in Hampshire Angliæ (Alchorne), in Madera"—the two last words were added later. Solander also gives, on another page, the locality "Habitat copiose prope Revesby in Lincolnshire."

In calling the plant *nudicaulis* Solander was adopting the earliest specific name : it is the *Crepis nudicaulis* of L. (Sp. Pl. 805). In his original description, Linnæus does not refer to the "Hieracium pumilum saxatile asperum præmorsa radice" of Ray's Synopsis, ed. 3, 167, as a synonym; but this reference—the first record of the plant as British—was added by Hudson (Fl. Anglica 297 (1762)), who placed *Crepis nudicaulis* as a synonym of his *Leontodon hispidum* β, and adopted by Linnæus in his second edition (p. 1123 (1763)), who there renamed *C. nudicaulis Leontodon hirtum*. There is no specimen of *Crepis nudicaulis* in the Linnean herbarium, but there is no reason to doubt its identity with the English plant which, as his citation from Ray shows, was certainly contemplated by Linnæus when he described *L. hirtum*. Neither Prof. Beck nor Mr. Williams makes any reference to *C. nudicaulis*, although, as has been shown, Linnæus himself quotes it as a synonym of *L. hirtum* ; hence it is clearly the oldest specific name.

An examination of Solander's MSS. shows that by his *nudicaulis* he primarily intended the British plant, as was pointed out by Lowe in a passage to be quoted later. His descriptions—there are two—were drawn up from Alchorne's specimen, now in the National Herbarium, and from the Revesby plant ; and he cites the synonymy of Ray and Hudson. The reference to the Madeira plant was added later—I think by Banks; the citation of *Crepis nudicaulis* was struck out also, I think, later, as had Solander himself done it he would, as he usually does in such cases of correction, have altered his own name for the plant, which is twice retained. This addition of the Madeira plant led Lowe into an error which he corrected later ; in his *Primitiæ Fl. Mader.* (p. 28) he gave the name *Thrincia nudicaulis* to the Madeira plant, quoting in synonymy "*Leontodon nudicaule* Herb. Banks," but later, in his *Flora of Madeira* (i. 535) says : "The sheet in B H [Banks Herb.] inscribed by Solander *propria manu** 'Leontodon nudicaule Mscr. Madera' is truly the common Mad. *T. hispida* Roth. var. & Lowe. But *nudicaule* Sol. MSS. in B H is a mixture of this with English *T. hirta* Roth. For though Solander in his MSS. says of his *L. nudicaule* 'Radix præmorsa,' it is distinctly fusiform or tapshaped in this his original Mad. spec. And his other localities, 'Revesby in Lincolnshire' and 'Petersfield in Hampshire' show him clearly to have had mainly in view *T. hirta* Roth." I have already stated the position of this plant when commenting on the name as pub-

* The name is not in Solander's hand, but in that of one of the clerks employed by Banks.

lished by Brown in Buch's Phys. Beschreib. Canar. Inseln, 194 (see Journ. Bot. 1904, 47), but for the sake of clearness I print it again here.

The synonymy will be :—

THRINCIA NUDICAULIS (comb. nov.).

Crepis nudicaulis L. Sp. Pl. 805 (1753).
Leontodon hispidum β Huds. Fl. Anglica 297 (1762).
L. hirtum L. Sp. Pl. ed. 2, 1123 (1763).
L. hispidum β *hirtum* Huds. Fl. Anglica ed. 2, 340 (1778).
L. nudicaule Sol. MSS. in Herb. Mus. Brit. !
Hyoseris pygmæa [Dryand. in] Ait. Hort. Kew. iii. 130 (1789) and in Herb. Mus. Brit. : cfr. Lowe Fl. Mader. i. 535.
L. Leysseri Beck Fl. Nied. Oesterr. 1312 (1893); Williams, Prodr. Fl. Brit. 70 (1901).

The following should be referred to *Thrincia hirta* Roth :—

Leontodon nudicaule Sol. MSS. quoad pl. Mader.; Br. in Buch Canar. Ins. 194 (1825) ; Ind. Kew. ii. 52 (excl. syn.).
Thrincia nudicaulis Lowe Prim. 28 ; DC. Prodr. vii. 100.

SHORT NOTES.

CYSTOPTERIS FRAGILIS IN SUFFOLK.—In Hind's *Flora of Suffolk*, p. 420, it is stated that Newman records this, but without locality, and the only localities given are "Bungay, *Moore*, 1859?" and "Yoxford, *Moore*?" In Mrs. Lyell's recent *Life of Sir C. J. F. Bunbury* (ii. 181), Bunbury, writing from Barton to Sir Charles Lyell on Nov. 5, 1863, says: "About a week ago Scott brought me some leaves of a fern, which he had found growing on the brickwork lining of an old wall, very near here; it proved to be the *Cystopteris fragilis*, a fern which I had never before seen in Suffolk; and which I believe is generally rare in the plains of England." It may be noted that the *Life* contains many allusions to and particulars concerning Bentham, with whom Bunbury was on intimate terms, and for whom he evidently had much affection; his name does not appear in the index (nor, so far as I have noticed, in the text) of Mr. Jackson's memoir, noticed in this Journal for November last.—JAMES BRITTEN.

PLANTS OF WYBUNBURY, CHESHIRE.—In July, 1905, I spent a day or two in the above neighbourhood, when I was accompanied by Mr. A. H. Evans, and we were delighted to see that the "Moss" still offers much of botanical interest. The cranberry was fruiting freely, and the flowers of the beautiful *Andromeda* were a great delight. *Lastræa Thelypteris* is still abundant, although *L. cristata* appears to have been eradicated. In the following notes plants new to district 6 of the *Flora of Cheshire* are indicated by an asterisk; two asterisks indicate what is apparently a new county record. Where no locality is given the plant was found in the

Moss, or in the adjoining district. *Papaver Rhœas* L. **var. *Pryorii* Druce. *Corydalis claviculata* DC., plentiful, especially on the wood borders. **Polygala serpyllacea* Weihe. *Stellaria media* Cyr. var. *neglecta* Weihe, Shavington. *Arenaria trinervia* L., doubtless accidentally omitted from the *Flora*; it is included in *Top. Bot.* ***Spergula sativa* Boenn. *Rubus Lindleianus* Lees, in several places between Crewe and Wybunbury; *R. Sprengelii* Weihe, rather common in the wood bordering the Moss. **Epilobium angustifolium* L. **Ribes rubrum* L. **Galium elongatum* Presl. **G. Witheringii* Sm. **G. uliginosum* L. *Hieracium sciaphilum* Uechtr. **Pedicularis palustris* L.; *Melampyrum pratense* L., the red-brown plant common on the Moss seems to be nearer to *montanum* than to *ericetorum*, see *Flora*, p. 219, and *Journ. Bot.* 1896, 136. **Pinguicula vulgaris* L. **Ulmus montana* Sm., Shavington, &c. *Salix pentandra* L., with it a hybrid, which, as Major Wolley Dod suggests, is probably *fragilis* × *pentandra* L.; **S. purpurea* L., rare; **S. Smithiana* Willd., Crewe. *Potamogeton pusillus* L. *Orchis maculata* L. ** subsp. *ericetorum* Linton. *Epipactis latifolia* All., in the wood at Wybunbury. **Scirpus pauciflorus* Lightf., **S. fluitans* L. **Eleocharis multicaulis* Sm. *Carex diandra* Schrank, plentiful in several parts of the Moss; *C. paniculata* L. **var. *simplicior* And.; **C. limosa* L., locally common and variable, the fruit of some plants answering to the description of those of *irrigua*; **C. pallescens* L., **C. lævigata* Sm., **C. filiformis* L., **C. acutiformis* Ehrh., **C. riparia* Curt., *C. rostrata* Stokes, as a very narrow-leaved plant *Arrhenatherum elatius* *var. *nodosum* Reichenb. **Glyceria plicata* Fr. and **Alopecurus myosuroides* Huds., near Crewe, **Festuca rubra*, L., Shavington, &c. —G. Claridge Druce.

Ophrys Trollii Hegetschw. in Oxfordshire.—In 1905 some school-children at Finstock gathered a curious form of the bee-orchis in that neighbourhood, but it had withered too much before I saw it to allow me to identify it. This year it was sent again by Mr. H. Powell when I was away, but I was enabled to see that it was a form worth examination; and at the British Museum Herbarium I was enabled to identify it with the above plant. The very long gradually acuminate termination to the outer divisions of the perianth and labellum gives it a very striking appearance, although no doubt it is not specifically distinct. It appears to have only been recorded in Britain previously from Reigate.—G. Claridge Druce.

Parietaria officinalis L. (Journ. Bot. 1906, 429).—The peculiarity of the stamen-unfolding was pointed out to me many years ago by a friend—not a botanist; and one has often amused oneself by touching the stamen with a pin or pencil and making it jump, and fling its pollen. I imagined it was a fact well known to botanists.—H. J. Riddelsdell.

Vicia monosperma (Journ. Bot. 1906, p. 409).—M. Beauverd, of the Herbier Boissier, points out to me that this name was given in 1841 by Koch to a plant a description of which he published in *Linnæa*, xv. 721. Unfortunately I overlooked this, but as Boissier

(Fl. Orient. ii. 579) and other authorities who have not totally ignored the name have reduced Koch's *V. monosperma* to *V. cassubica* L., there seems no reason why the name should not be adopted for the new vetch from Porquerolles.—H. S. Thompson.

Aspicilia Lilliei.—The following description of a new British lichen by Dr. M. Bouly de Lesdain appears in the *Bulletin de la Société Botanique de France*, vi. 515 (1906):—"Aspicilia Lilliei B. de Lesd. nov. sp. Ecosse; Caithness, Ousdale supra saxa granitica. Leg. Révérend *D. Lillie*, 1905. Crusta tartarea, circa 0 mm. ·5 crassa, rimoso-areolata, alba, intus flavida, K— C— KC—. Apothecia minuta, atra, in areolis immersa, rotunda-deformia, vel lirellæformia. Epith. olivaceum, hypoth. incoloratum, paraphyses gelatinoso-concretæ, asci anguste clavati. Sporæ 4-6-nées, ellipsoideæ, 13-15 μ lat. 5-6 crass. Gelat. hym. I, intense cærulescit. Cette espèce a tout à fait l'aspect de l'*Aspicilia calcarea* dont elle diffère par son thalle jauni intérieurement, et par ses spores." In the same paper (p. 517) *Rhizocarpon Lotum* Stizenb. collected by Mr. Lillie in Caithness in 1905 is noted as new for Britain and described from Mr. Lillie's specimens.

NOTICES OF BOOKS.

Index Filicum sive Enumeratio omnium generum specierumque Filicum et Hydropteridum ab anno 1753 ad annum 1905 descriptorum adjectis synonymis principalibus, area geographica etc. By Carl Christensen. Hafniae: apud H. Hagerup. 1906. Fasc. xi. pp. 641–704; price 3s. 6d. Fasc. xii. pp. 705–744, i–lx; price 5s. 6d.

This important contribution to the literature of ferns has been in process of publication since the summer of 1905, the parts appearing at frequent intervals. With the issue of parts xi. and xii. it is brought to completion. The work is divided into three sections, which deal with the genera, species, and literature respectively. By far the largest of these is the second section, which consists of an alphabetical enumeration of the species and their synonyms; it occupies 670 pages, it necessitated upwards of 22,000 entries, and it comprises 5940 species. It was the first part of the book to be published, and was followed by the third section, which consists of a catalogue of all fern literature that contains descriptions of new genera or species. This bibliography occupies 74 pages, and is presented in three aspects: first, an alphabetical list of authors with the titles and dates of their papers (the abbreviated citations employed throughout the work receive here their explanation); secondly, a geographical grouping of the floras under continents, countries, islands (this cannot fail to be of great assistance to those who are in search of local floras, though all lists are excluded which do not contain descriptions of novelties); and, thirdly, a list of genera, with the special monographs which have been written upon them. Finally, we have that section of the

book that concerns itself with the genera; though held back till the rest of the work had been published, it will naturally take its place at the beginning of the volume when bound. It consists of a systematic enumeration of the 149 recognized genera, with their synonymy arranged both chronologically and systematically. It is based on Diels's classification in Engler and Prantl's *Die natürlichen Pflanzenfamilien*. The type species (if known) is quoted in a prominent position under each genus.

Now that the work is complete, it is possible to realize more clearly the great service which Herr Christensen has rendered to pteridologists by collecting and arranging in so concise and convenient a form such a vast number of citations and synonyms. Among the chief stumbling-blocks of pteridology in the past have been the want of correspondence between the rival systems of classification, the lack of coincidence in the ground covered by the genera of the respective systems, and the difficulty of determining the synonymy of the various species. These and other such troubles of nomenclature need trouble us no longer, thanks to Herr Christensen's patiently elaborated *Index*—a work which has taken long years to prepare, and which by the accuracy of its citations reveals the ungrudging care bestowed upon its compilation. In connection with English ferns it will be noticed that there is a slip which calls for correction. *Trichomanes pyxidiferum* of Hudson's Flor. Angl. p. 392 (1762), is referred by the author to *Hymenophyllum tunbridgense* as a synonym, but it is evident from the station quoted by Hudson for the plant that the latter is *T. radicans* Sw. Hudson says (*loc. cit.*) that it was found by Dr. Richardson "at Belbank, scarce half a mile from Bingley, at the head of a remarkable spring." It would of course be no matter for surprise should some errors of this sort be found in so intricate and exacting a piece of work, however carefully the author may have prepared his manuscript and revised his proofs. The real marvel is that anyone should have succeeded in producing a result so near perfection.

A. G.

Indian Trees: an account of Trees, Shrubs, Woody Climbers, Bamboos and Palms indigenous or commonly cultivated in the British Indian Empire. By Dietrich Brandis, K.C.I.E., &c., assisted by Indian Foresters. Royal 8vo, cloth, pp. xxxiv, 767. Price £1 1s. Constable & Co.

In this handsome volume Sir Dietrich Brandis has summarized the results of half-a-century's study of his subject. During the twenty-eight years of his Indian service, beginning with his appointment in 1856 to the charge of the forests of Pegu, he was collecting material, and since his retirement he has devoted himself to its elaboration in relation to the great herbaria of this country—primarily to that of Kew, which for Indian plants is unrivalled. He has continually received notes and collections from his former colleagues and from those who have succeeded them, and, being thoroughly acquainted with the copious literature of the subject,

has embodied in his book the observations of others. His work therefore may, save for one omission—that of the Calcutta Herbarium—for which Sir Dietrich expresses his regret, be considered a complete *résumé* of our knowledge of Indian trees, using the term in the extended sense which appears on the title-page of the book.

An extended notice of the volume could only be fitly undertaken by an expert, but no intimate knowledge of the subject is required in order to judge of the completeness with which Sir Dietrich has executed the task he has set himself. He has not confined himself to the common and important species, although these are naturally his primary consideration, but has added in smaller type a large number of others which he tells us he has "dealt with in a very summary manner," but which are nevertheless sufficiently diagnosed to ensure recognition.

The sequence of orders follows that of Bentham and Hooker, but their limitation in some cases is that of Engler and Prantl. The "practical advantage" of the division of certain groups is, as the author says, "very great," and we are glad to see *Vacciniaceæ* combined with *Ericaceæ*. In the matter of change of names, Sir Dietrich has exercised a conservatism which, although temporarily convenient, may perhaps be regretted; it is not easy, for example, to see why *Stephegyne* should not be replaced by the earlier *Mitragyna*, although the author says he does not "feel justified" in making the substitution and in his appendix (p. 711) discusses the question. But as the book must have been for the most part in type before the publication of the Vienna rules, conservatism was to be preferred to the system which has added so many useless combinations to our already over-abundant synonymy.

Considerable prominence is given to the vernacular names, as to which Sir Dietrich's dictum that "if sifted with care [they] are valuable whatever may be said to the contrary" is important, based as it is on so many years' experience in the forest. The two hundred figures, by Dr. Roland Anheisser of Cologne, add materially to the usefulness of the book in the field, from a botanical standpoint, and also—which is less satisfactory—to its weight, for we presume the heavy paper employed in the volume was rendered necessary by their requirements; they include many species not, we think, previously figured, the more common trees being omitted.

The addition of twenty-three pages of addenda, made during the printing of the book, shows the care that has been taken to bring it up to date. We note among them what appears to be a new species of poplar—*Populus glauca* Haines MSS.; *Nauclea Gageana* "King MSS." (p. 368) was published in the *Flora of the Malayan Peninsula*, but doubtless since Sir Dietrich's reference was in type.

The author modestly says that his book "is not intended for botanists, it is written for the use of foresters and of practical men," and of course, and very rightly, it is the latter whom he primarily considers; but the work will find a place in every botanical library as the most complete compendium of the subject of which it treats.

Progressus Rei Botanicæ. Herausgegeben von der Association Internationale des Botanistes; redigiert von Dr. J. P. Lotsy in Leiden. Bd. i., Heft 1. 8vo, pp. 317. Jena: Fischer. 1906 (dated 1907).

The Association Internationale des Botanistes and its indefatigable general secretary, Dr. Lotsy, are to be congratulated on the appearance of the first part of their new publication—*Progress of Botany*. It is now some years since the Association took over the *Botanische Centralblatt*, to make of it a *résumé* of current botanical publications; this has served and still serves a useful purpose in giving brief abstracts of single books and papers. The new work supplements the former, in giving a general account of work on specific lines over a longer period. If succeeding parts are equal in value to the first, the success of the work should be assured. Part i. contains contributions from four botanists. The veteran Professor Strasburger opens with an account (in German) of work done on the ontogeny of the cell since 1875. His paper fills one hundred and thirty-eight pages, and is illustrated with excellent figures from various sources, many from his own works, others from the works of botanists who have studied in his laboratory or gained inspiration from his writings. A great deal of matter is compressed into this comparatively short account, and further help is given by numerous references to literature. Those who have not made cytology a special study have in Professor Strasburger's account the opportunity of appreciating the present position of this recent development.

Dr. Scott's contribution (in English), "The present position of Palæozoic Botany," does for fossil botany what Professor Strasburger's paper does for cytology. And here again there is no need to emphasize the special fitness of the author for his task. Carrying on the work started by Williamson, Dr. Scott has, by his own effort and the efforts of younger workers whom he has gathered round him, brought palæozoic botany to such a position of strength and importance as probably Williamson never imagined. His lucid sketch of our knowledge of palæozoic plants and their affinities, as affected by recent discoveries, fills eighty pages, and is admirably illustrated by thirty-seven figures, including the large double plate of the now familiar restoration of *Lyginodendron Oldhamium*. Mr. Arber's classified bibliography and literature on palæozoic fossil plants, including some of the more important memoirs published between 1870 and 1905, forms a useful appendix.

Lastly, there is the contribution in French by Prof. Charles Flahault on the progress of geographical botany since 1884, its present position, and its problems. Prof. Flahault's ecological work is well known, and the ecological aspect holds an important place in his eminently readable account of the position and prospects of the study of plant distribution, which fills more than seventy pages.

Succeeding parts will be issued at intervals of about four months, and each annual volume will contain about forty sheets. The price to members of the Association will be 13 marks a volume,

to outsiders 18 marks. The following parts of vol. i. will contain contributions on fungi, by Prof. G. Vuillemin; on physiological subjects, by Prof. Czapek and Prof. Noll; on hybrids since Mendel's time, by Mr. Bateson; and on tertiary fossils, by Prof. Laurent.

A. B. R.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 15th November, on behalf of Mr. John Cryer, of Shipley, the General Secretary exhibited a series of twenty-one specimens of *Polygala amarella* Crantz, selected to show its wide range of form under various conditions. In a communication which was sent with the plants, Mr. Cryer states that this species, which grows on the Great Scar Limestone, in the West Riding of Yorkshire, was to be seen the past season in great abundance over an area of about thirty-six square miles. The first six specimens shown were from three to eight inches high from an elevation of 750 ft.; as the elevation increased the height diminished, till the plant became less than one inch high. Blue-flowered specimens were found well distributed over the whole area; white-flowered specimens were unequally distributed; rose-coloured plants were only found in one locality, but there it was locally abundant. Spathulate rosettes of root-leaves are the winter state of the plant. One characteristic of *Polygala amarella* is that it can grow where there is but little soil for its support. Mr. Cryer has found it growing on what was almost bare rock; it has the habit of thrusting its roots into the cracks and crevices of rocks, or between the stones and rocky fragments. Wherever he has found it, with one exception, there has been little or no depth of soil. A figure from specimens sent by Mr. Cryer from Grassington, and a description of the plant and its locality, will be found in this Journal for 1903, p. 113, t. 450.

An amusing and interesting article on Truffle-hunting by Harwood Brierley in the *Pall Mall Gazette* for Dec. 8 informs us that "the truffle's scientific name is 'Tuber æstivum' and the potato's name 'Tuber solanum'; therefore both are tubers, and the artichoke is another." In a subsequent paper the same writer discourses on "the mistletoe, *Viscus* (*sic*) *album*," "of which botanists inform us there is one species only," and proceeds to say "Is it worth while making a suggestion that not mistletoe, but *Loranthus europæa* was the sacred evergreen clipped by the Druids?" We think Mr. Brierley, whose papers indicate observation, would do well to refer them to a botanist before publishing, so as to ensure greater accuracy in details.

We are glad to learn that *The Flora of West Lancashire*, by Messrs. J. A. Wheldon & Albert Wilson, is in an advanced state of preparation and will be issued in the spring. It includes a list of flowering plants, ferns, mosses, hepatics and lichens, recorded for the vice-county, as well as a description of the physical geography

and geological and botanical features of the eight districts into which the area has been divided; and an account of the more interesting plant associations, with chapters on meteorology and climate and the distribution of species as affected by altitude, and the physical and chemical characters of rocks and soils. The price to subscribers, who should communicate with Mr. Wheldon at 60 Hornby Road, Walton, Liverpool, will be 10s. 6d.

We learn with regret of the death of Professor Ernest Pfitzer, of Heidelberg University. Professor Pfitzer was with us a few months ago at the "Hybrid Conference," in the proceedings of which he showed much interest, and subsequently at the British Association meeting. His philosophical work on the morphology and classification of the orchids is well known; he elaborated the order for the *Pflanzenfamilien*, and his account is remarkable for the system of arrangement of genera, in which he abandons the supreme position given by Lindley to the character of the androecium, and takes into account the vegetative development of the plant. Prof. Pfitzer was engaged at the time of his death on a group of orchids for the *Pflanzenreich*, and in connection with this work had paid several visits to the great collections at Kew and the British Museum.

By the death, on Nov. 20, of Mr. Frederick Justen, proprietor of the firm known as Dulau & Co., a familiar figure to botanical book-lovers and to frequenters of the meetings of the Linnean Society has been removed from among us. We shall say more about him later.

Mr. G. C. Churchill, who died on Nov. 11 at his residence, Clifton, Bristol, aged 84, was for many years the distributor in this country of the sets of plants collected by Rupert Huter (with whom he was on terms of intimacy) and other Swiss botanists. Although he published but little, he had a good critical knowledge of the plants of the Dolomite region, which he frequented for many years, especially of Primulas; he contributed a note on *Woodsia glabella* to this Journal for 1864, p. 56. His herbarium has been sent to Kew.

The illustrated *Haandbog i Norges Flora*, by the late Axel Blytt, which, under the editorship of Dr. Ove Dahl of the Christiania Museum, has been appearing in parts since 1902, is now published complete in a handy volume of 800 pages, by A. Cammermeyer of Christiania. We hope to be able to notice it later, meanwhile our readers may like to have their attention called to it.

The Report for 1905 of the General (Fielding) Herbarium at Oxford announces that in connection with the investigation of the plants figured in Dillenius's *Hortus Elthamensis*, some of the specimens have been examined by Messrs. C. B. Clarke and J. G. Baker. These plants have hitherto been incorporated in the Sherardian Herbarium; they have now been sorted out, and will be preserved as a distinct collection. The Herbarium has acquired a collection of British plants (400) made by the late Mr. Johnson, and a small but interesting set of Persian plants, collected and presented by the Rev. Napier Malcolm.

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CONTENTS

	PAGE
Alabastra Diversa.—Part XIV. By Spencer le M. Moore, B.Sc., F.L.S.	41
Some Spanish and Balearic Plants. By Cedric Bucknall, Mus. Bac. Oxon	53
Notes from Cornwall. By W. Botting Hemsley, F.R.S...	60
A New *Limonia* from Uganda. By Edmund G. Baker, F.L.S. ..	61
Frederick Justen. (With Portrait.)	62
New and Rare British Hepaticæ. By Symers M. Macvicar	63
Mr. J. G. Baker. (With Portrait.)	67
Bibliographical Notes:— XLI.—The "Illustrations of Australian Plants"	68
Short Notes.—*Erythræa capitata* Willd. on the Mainland of Hants.—Caermarthenshire Plants.—*Cystopteris fragilis* in Suffolk.—*Orobanche purpurea* Jacq. in Pembrokeshire.—Berks and Hants Rubi.—Cardigan Plants	71
Notices of Books:— Biologische und Morphologische Untersuchungen über Wasser- und Sumpfgewächse, II. Von Prof. Dr. Hugo Glück in Heidelberg	73
Manual of the New Zealand Flora. By T. F. Cheeseman, F.L.S., F.Z.S.	74
Book-Notes, News, &c.	75
Supplement—A Flora of Glamorganshire. By H. J. Riddelsdell, M.A.	

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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ALABASTRA DIVERSA. — Part XIV.

By Spencer le M. Moore, B.Sc., F.L.S.

New or Little-known African Gamopetalæ.

The following memoir is almost entirely devoted to some notices of plants sent from two regions of tropical Africa, regions in respect of the botany of which the National Herbarium has, thanks to the assiduity of various correspondents, assumed of late years a leading position among the great herbaria of the world. One of these correspondents, Mr. Fred. Eyles, has before been mentioned in these pages* in connection with plants from Southern Rhodesia, especially the Matopo Hills. To the labours of the other, Dr. A. G. Bagshawe, we are already indebted for the consignments on which is based the recent memoir on the botany of the Anglo-German Uganda Boundary Commission,† as well as for a number of specimens subsequently gathered in the Entebbe district, of which specimens some were described in this Journal last year.‡ Latterly Dr. Bagshawe has visited the south-western districts of the Uganda Protectorate, and it is with the *Gamopetalæ* of the collections there made that the following pages partly deal. Dr. Bagshawe's chief localities and their respective altitudes (in feet) above sea-level are as follows:—

In Toro. Fort Portal (5000). Durro Forest (about 3200). Mpanga Forest (4000). Near Nisisi River (4500). Wimi Forest (3500). Near Wimi River (about 4000).

In Unyoro. Near Hoima (3000). Valley of the Waki River (2500–2800). Neighbourhood of Masinde (3000). Budongo Forest (3000). Butiaba, on Lake Albert (2300–2800). Kibera, on Lake Albert (2200).

In Uganda. Valley of the Kafu River (about 3000). North of Kakumiro (3500).

In Kitakwenda. Near Mpanga River (about 4000).

This latest exploration confirms the impression derived from the Uganda memoir mentioned above, as also from the report on Mr. M. T. Dawe's work prepared at Kew,§ as to the eastward extension of many species hitherto known only from the Upper and Lower Guinea botanical provinces. At the same time the westward range, up to the limits of the Protectorate, of a fair number of eastern species has now been determined. In both these respects it is anticipated that Dr. Bagshawe, whose numbers already reach to over eleven hundred, will be the means of further additions to

---

* Journ. Bot. 1905, pp. 44–54. See also Journ. Linn. Soc. Bot. xxxvii. pp. 298–330, *passim*.

† Journ. Linn. Soc. Bot. xxxvii. pp. 116–227.

‡ Journ. Bot. 1906, pp. 83–90, and pp. 341–2.

§ Report on a botanical mission through the forest districts of the Uganda Protectorate. Blue Book, Cd. 2904 (1906). See also Stapf in Journ. Linn. Soc. Bot. xxxvii. p. 497.

our knowledge, as he is still in the field, and parcels from him are arriving at frequent intervals.

Mr. Eyles's localities, also with their respective altitudes, are :—

Mazoe (4300). Mazoe, Iron-mask Mountain, an ironstone formation (5200–5300). Sebakwe, on open veld (4000). Bulawayo (4500), and the Matopo Hills (5000).

Needless to say, no full list is here given, only species considered new finding a place, and plants interesting from their rarity or habitat.

Acknowledgments are due to Mr. Hiern, who kindly furnishes the description of a new *Euclea*.

Rubiaceæ.

Mitragyna rubrostipulacea Hav. in Journ. Linn. Soc. Bot. xxxiii. 73.

Toro, near Mpanga Forest; *Bagshawe*, 1013.

Randia malleifera Hiern in Fl. Trop. Afr. iii. 98.

Near Hoima, Unyoro; *Bagshawe*, 940.

Vangueria velutina Hiern in Fl. Trop. Afr. iii. 151.

Mazoe, top of Iron-mask Mountain; *Eyles*, 201.

"A tree 15 ft. high. Flowers greenish. Fruit green."

Vangueria Bagshawei, sp. nov. Fruticosa ramulis patentibus glabris sat gracilibus bene foliosis mox puberulis novellis hirsutulis, foliis parvis brevipetiolatis ovatis vel ovato-oblongis cuspidulatis apice obtusis basi obtusis rotundatisve sæpe aliquanto obliquis tenuiter membranaceis utrinsecus pilis appressis hispidulis sparsiuscule obsitis costis secundariis utrinque 4 ascendenti-arcuatis, stipulis lineari-subulatis acutis, floribus in axillis solitariis pedunculatis pedunculo puberulo juxta medium bracteato, calycis puberuli tubo cylindrico-turbinato quam limbus dentatus longiore, corollæ tubo (ovario) subcylindrico ima basi paullulum angustato extus glabro 3-loculari lobis oblongo-lanceolatis longicaudatis quam tubus longioribus extus hirsutulis, antheris subsessilibus subinclusis, stylo breviter exserto glabro, stigmate tumido truncato leviter angulato.

Hab. Mpanga Forest, Toro; *Bagshawe*, 1009.

Folia modice 3·0–5·0 cm. × 1·5–2·5 cm., supra olivacea, subtus pallida; petioli graciles, setulosi, 0·2–0·4 cm. long. Stipulæ 0·5–0·7 cm. long., extus deorsum setulosæ ceterum fere glabræ, hujus basis diuscule persistens. Pedunculi solemniter circa 0·6 cm. long.; bracteæ inferne connatæ, ovatæ, acuminatæ, circa 0·2 cm. long. Flores albi. Calycis tubus 0·15 cm., limbus 0·1 cm. long. Corolla tota humectata 1·4 cm. long.; tubus 0·5 cm. long., ima basi 0·2 cm. faucibus 0·3 cm. lat.; lobi 0·9 cm. long., inferne 0·2 cm. lat. Filamenta 0·075 cm. long.; antheræ ovato-oblongæ, apice obtusæ, appendicibus basalibus linearibus haud exemptis 0·2 cm. long. Stylus deorsum incrassatus, sursum gracilior, 0·6 cm. long.; stigma fere 0·2 cm. diam.

Known by the small thinly membranous leaves pale below, the solitary flowers, long tails to the corolla-lobes, &c.

Fadogia obovata N. E. Br. in Kew Bull. 1906, 105.
Mazoe Valley; *Eyles*, 209.
"Plant 3–4 ft. high. Corolla-tube green, tips of segments white inside. Anthers brown. Stigma and berries green."

Pavetta assimilis Sond. in Fl. Cap. iii. 20.
Sebakwe; *Eyles*, 168.
A South African plant recently found by Dr. Bagshawe in the Uganda Protectorate.

P. brachycalyx Hiern in Fl. Trop. Afr. iii. 169.
Durro Forest, Toro; *Bagshawe*, 1082.
An Upper Guinea plant (Cameroons to Gaboon). Dr. Bagshawe's specimen has small flowers like those of *Mann*, 1729. The long-flowered form referred here by Hiern (*Mann*, 2159) may perhaps prove a distinct species.

P. Cecilæ N. E. Br. in Kew Bull. 1906, 106.
Mazoe, on Iron-mask Mountain; *Eyles*, 203.
Plant about one foot high. Flowers cream, with sour odour.
This is new to Rhodesia, the type having been found near Beira in Portuguese East Africa.

Coffea (§ Exsertæ, Perennes) **eugenioides,** sp. nov. Frutex glaber, copiose ramosus, ramulis gracilibus ascendenti-patentibus bene foliosis, foliis oppositis pro rata parvis brevipetiolatis ovato-oblongis obtusissimis cuspidato-acuminatis basi breviter angustatis tenuiter coriaceis costis secundariis utrinque circa 8 ascendenti-patulis marginem versus aperte fornicatis, stipulis parvis e basi lata in acumen breve subulatum exeuntibus vel apice solummodo acutis, floribus in axillis solitariis vel 2–3-nis breviter pedicellatis, calyculo brevi ore denticulato, calycis tubo (ovario) ex calyculo eminente oblongo-turbinato limbo brevissime necnon obscure denticulato, corollæ 5-meræ hypocrateriformis tubo sursum levissime expanso lobis oblongis obtusis tubum æquantibus vel paullo excedentibus, filamentis quam corollæ lobi triplo brevioribus antheris exsertis linearibus cacumine quoque obtusis vel obtusiusculis, stylo incluso filiformi ramis exsertis linearibus se ipsum excedentibus, bacca oblonga exsucca loculo altero fere evanido 1-sperma.

Hab. Forest near Mpanga, Toro; *Bagshawe*, 1076.

Folia verisimiliter perennia solemniter 4·0–7·0 cm. long., 2·0–3·0 cm. lat., in sicco supra olivacea vix nitidula, subtus pallescentia; acumen circa 0·8 cm. long., basi 0·5 cm. apice 0·2 cm. lat.; petioli 0·5–0·8 cm. long., fac. sup. late ac minime alte canaliculati; stipulæ mox deciduæ, 0·4 cm. long. vel minus. Calyculus vix 0·15 cm. alt. Pedicelli crassiusculi, 0·2 cm. long. Flores albi. Calycis tubus 0·15 × 0·175 cm. Corollæ tubus 0·7 cm. long., basi 0·15 cm. faucibus 0·3 cm. diam., lobi 0·7–0·8 × 0·3 cm. Filamenta 0·25 cm., antheræ 0·75 cm. long. Stylus 0·65 cm., hujus rami 0·8 cm. long. Bacca in sicco 0·9 × 0·6 cm., apice obtusissima, brunnea.

To be inserted next *C. brachyphylla* Radlk., a Madagascar species with several differences in leaf and flower.

Psychotria maculata S. Moore in Journ. Bot. 1906, 84.
Wimi Forest, Toro; *Bagshawe*, 1032.

Grumilea saltiensis, sp. nov. Fruticosa, novellis puberulis exemptis fere omnino glabra, foliis majusculis oblongo-ovatis breviter cuspidato-acuminatis apice acutis basi in petiolum longum extenuatis tenuiter coriaceis pag. inf. summum obscure puberulis costis secundariis utrinque circa 12 proximalibus patentissimis paucis distalibus arcuato-ascendentibus omnibus prope marginem dichotomis, stipulis parvis inferne connatis ovatis acuminatis ferrugineo-puberulis mox glabris diuscule persistentibus, floribus in cymis congestis pedunculatis plurifloris paniculam terminalem quam folia breviorem constituentibus dispositis, pedicellis brevissimis incrassatis, calycis tubo (ovario) subsphæroideo piloso limbum cyathiformem breviter dentatum æquante, corollæ tubo cylindrico calycem 2½-plo excedente faucibus albo-villosis lobis 4 quam tubus paullo brevioribus oblongis obtusis extus puberulis, antheris subinclusis vel exsertis, disco incrassato, stylo incluso exsertove ramis brevibus spathulatis, bacca parva sphæroidea calyce coronata levi 2-sperma, seminum albumine carnoso ruminato.

Hab. Toro, Mpanga Forest, also forest near Isunga; *Bagshawe,* 1006, 1092.

Caulis sat robustus statu juvenili aliquanto complanatus, in sicco fusco-olivaceus. Foliorum limbus 12·0–17·0 × 5·5–8·0 cm., glandulis pellucidis creberrime donatus, fac. sup. olivaceus vix nitidulus, altrinsecus dilute viridis; costa centralis (ut costulæ) fac. sup. impressa satis tenuis, fac. inf. basin versus fere 0·15 cm. lat., omnimodo prominens; petioli 3·0–4·0 cm., stipulæ 0·6–0·9 cm. long. Panicula florescens 4·0–7·0 cm. long. et totidem diam., fructescens vero ex exemplario unico mihi obvio 13·0 × 10·0 cm. Flores albi vel lutei. Pedicelli 0·13 cm., calycis tubus 0·1 cm., limbus 0·1 cm., corolla tota 0·45 cm., tubus 0·25 cm., lobi 0·2 cm. long. Filamenta nunc brevissima, sc. 0·05 cm. long., nunc 0·15 cm. long.; antheræ oblongæ, obtusæ, circa 0·1 cm. long. Stylus nunc 0·15 cm. nunc 0·25 cm. long.; rami 0·1 cm. long. Bacca sicca 0·6 × 0·55 cm.

Known by the leaves, the entire acuminate stipules, the paniculate congested cymes, &c.

This appears to be a heterostyled species. In spite of the difference in colour of the flowers noted by Dr. Bagshawe, I can see no reason to separate the two specimens described above.

Compositæ.

Vernonia pumila Kotsch. & Peyr. Pl. Tinn. 37, tab. 17 A.

Hoima, Unyoro; *Bagshawe,* 947.

The specimens now to hand permit of a fuller diagnosis than has hitherto been the case. Thus the roots, frequently ¼ cm. in width, expand distally into tubers which may reach 4·5 cm. in length, and in breadth 0·6–0·8 cm. Interesting, too, are the barren leaf-bearing shoots, of which the slender stem—about 10 cm. long—is very sparsely provided with leaf-scales similar to those of the flowering shoots. The leaves themselves, crowded at the end of the stem, are sessile, oblanceolate, very obtuse, callous-toothletted at the margin, scabridulous-puberulous on the upper face and grey

tomentose below, and 5–7·5 cm. in length by 1 cm. (or less) in breadth.

V. Melleri Oliv. & Hiern in Fl. Trop. Afr. iii. 282.

Mazoe; *Eyles*, 185

"Grows 3–4 ft. high among long grass on unburnt veld."

Felicia lutea N. E. Br. in Kew Bull. 1901, 123.

Bulawayo, on schist formation, and on the open veld at Sebakwe; *Eyles*, 161 and 1216.

Aspilia polycephala, sp. nov. Herba erecta, ramosa, foliosa, caule foliisque pilis hispidis patulis copiose onustis, foliis sessilibus subsessilibusve lineari-lanceolatis raro lanceolatis obtusis basi angustatis, capitulis parvis breviter pedunculatis pauciflosculosis ad apicem ramulorum brevium in glomerulos paucicephalos a foliis ultimis involucratis congestis, involucri anguste campanularis 2-serialis phyllis exterioribus oblongis obtusis sursum membranaceis hispidis quam interiora oblonga vel anguste oblongo-ovata obtusa vel obtusissima omnino vel fere omnino cartilaginea et puberula vel apice hispidula paullo longioribus, ligulis 5 ex involucro eminentibus rotundato-obcordatis albis, achæniis oblongo-turbinatis appresse sericeo-pilosis, pappo cupulari fimbriato additis setis duabus brevibus inter se inæquilongis.

Hab. Fort Portal, Toro; *Bayshawe*, 993.

Planta saltem semimetralis. Caulis robustus, deorsum alte sulcatus necnon glabrescens, solum versus 0·7 cm. diam. Folia modice 3·5–5·0 cm. long. (raro 6·0 cm.), 0·6–1·4 cm. lat. (rarius adusque 2·0 vel etiam 2·5 cm.), in sicco viridia, integra vel obscure denticulata, margine ciliata, firme membranacea. Glomeruli circa 3–4-cephali, summum 2·0 cm. diam. Pedunculi circa 0·2 cm. long. Capitula circa 1·0 cm. long. Involucri phylla exteriora 0·75 cm., interiora 0·6 cm. long. Receptaculi paleæ 0·8 cm. long. Ligulæ 0·6 × 0·45 cm., 5-nervosæ, nervulis laxe reticulatis percursæ. Disci corollarum tubus 0·4 cm. long., dimidio inf. attenuatus, 0·02 cm. diam. superne 0·1 cm. diam. vel paullulum ultra. Achænia fusca, 0·45 cm. long.; pappi cupula 0·05 cm., aristæ 0·1–0·15 cm. long.

Differs from *A. helianthoides* Oliv. & Hiern, which also has white ligules, in the narrower sessile or subsessile leaves, the congested heads, somewhat different involucres, only five ray-florets, &c.

Aspilia Eylesii, sp. n. Caulibus e rhizomate robusto erectis sparsim ramosis gracilibus scabridis, foliis sessilibus lanceolatis vel lanceolato-ovatis utrinque obtusis basi trinervibus margine inæqualiter dentatis vel crenulato-denticulatis firme membranaceis utrinque scabridis, capitulis submediocribus terminalibus solitariis vel binis pedunculis scabriusculis folia magnopere superantibus fultis, involucri abbreviati 2-serialis phyllis ovato-oblongis acutiusculis appresse scaberrimis inferne cartilagineis superne membranaceis, receptaculi paleis apice subito acutatis, ligulis circa 12 involucrum paullo excedentibus, pappo brevissimo lacerato-ciliolato exaristato.

Hab. Sebakwe; *F. Eyles*, 164.

Planta summum 30 cm. alt. Folia 3·5–5·0 cm. long., 1·6–2·0 cm. lat.; petioli lati, scaberrimi, 0·2–0·3 cm. long. Pedunculi

5·0–8·0 cm. long., erecti. Capitula circa 2·0 cm. diam. Involucri phylla 0·5 × 0·2 cm. Receptaculi paleæ 0·6 cm. long., dorso margineque ciliolatæ. Ligulæ vivide aurantiacæ, obovato-oblongæ, 2–3-dentatæ, 0·8 cm. long. Disci corollæ complures, vix 0·5 cm. long. Achænia valde immatura 0·15 cm. long., glabra.

Near *A. zombensis* Baker, which has similar foliage, but involucres of longer and relatively narrower leaves, different ligules, &c.

Berkheya Adlami Hook. fil. in Bot. Mag. sub t. 7514.

Hab. Sebakwe, in open moist vlei; *F. Eyles*, 118.

New to Rhodesia, the type having been raised from seeds sent from Johannesburg. There is in the British Museum a specimen from Bulawayo of what is evidently this species (*Rand*, 149), but in so early a state that no attempt was made to determine it. An intermediate home for the plant is Pietersburg, Transvaal, where it occurs in grassy plains, according to the ticket accompanying a specimen kindly communicated to the Museum recently by Dr. Bolus (herb. no. 11096).

Campanulaceæ.

Lobelia stellarioides Benth. & Hook. fil. ex Hemsley in Fl. Trop. Afr. iii. 470.

Fort Portal, Toro, at 5000 ft.; *Bagshawe*, 987.

This plant was also collected by Mr. Scott Elliott (no. 7594) on Ruwenzori, at 5300 ft.

Cyphia mazoensis, sp. nov. Caule e tubere ovoideo enato volubili gracili inferne squamis parvulis sparsis exemptis nudo superne bene folioso glabro, foliis lanceolatis apice mucronatis basi in petiolum brevem sed distinctum breviter angustatis margine serrulatis membranaceis glabris, floribus in racemo terminali elongato volubili laxifloro dispositis, bracteis anguste linearibus pedicellos subæquantibus, calycis subhemisphærici puberuli lobis quam corolla multo brevioribus inter se aliquanto inæqualibus linearibus vel anguste lineari-spathulatis obtusiusculis, corollæ extus puberulæ petalis ima basi connatis inferne liberis superne connatis lobis oblongis obtusis anticis quam reliqui paullo longioribus, filamentis petalis brevissime adnatis, ovario semisupero, stylo crassiusculo inferne dilatato.

Hab. Mazoe, alt. 4700–4900 ft.; *F. Eyles*, 231.

Tuber 3·0 × 1·5 cm. Caulis basis squamuligera circa 7·0 cm. long.; squamulæ 0·1–0·2 cm. long. Folia modice 6·0–7·0 cm. long., 1·5–2·0 cm. lat., in sicco brunnescentes, subtus pallentia, serraturis apice callosis; petioli circa 0·5 cm. long. Racemus circiter 20·0 cm. long. Bracteæ ± 0·4 cm., pedicelli 0·5–0·6 cm. long. Flores rubro-punicei. Calycis tubus 0·2 × 0·22 cm.; lobi 0·4–0·5 cm. long. Corollæ "tubus" 0·7 cm. long., basi 0·33 cm. superne 0·25 cm. diam.; limbi lobi antici 0·7 cm., postici 0·6 cm. long., omnes 0·2 cm. lat. Filamenta 0·35 cm., antheræ 0·175 cm., stylus 0·3 cm., stigma 0·12 cm. long.

In the flower this is much like *C. glandulifera* Hochst., but the foliage is entirely different.

Under the above number is sent a second specimen with fibrous root, somewhat longer and narrower leaves, and flowers a little smaller. As there seems no essential difference between the two specimens, this is probably a first year's plant.

Plumbagineæ.

Plumbago Dawei Rolfe in Journ. Linn. Soc. Bot. xxxvii. 522.
Near mouth of Mpanga, Toro; *Bagshawe*, 1137.

Sapotaceæ.

Sideroxylon (§ Eusideroxylon) **oblanceolatum**, sp. nov. Arbuscula ramulis sat validis crebro foliosis cito glabris, foliis oblanceolatis obtusissimis basi in petiolum distinctum gradatim extenuatis pag. sup. glabris languide nitidulis altrinsecus minute albide furfuraceo-pubescentibus costis secundariis pluribus necnon tenuibus, floribus sæpissime axillaribus fasciculatis, pedicellis quam calyx brevioribus appresse sericeo-pubescentibus, calycis appresse sericeo-pubescentis lobis inferne connatis ovatis obtusis, corollæ tubo quam lobi ovato-oblongi obtusi paullo breviore, filamentis corollæ faucibus insertis filiformibus antheras oblongo-cordatas apice obtusas paullo excedentibus, staminodiis 5 parvulis lanceolatis acuminatis, ovario ovoideo-oblongo 5-loculo appresse villosulo in stylum brevem crassum villosulum exeunte, bacca ——.

Hab. Durro Forest, Toro; *Bagshawe*, 1087.

Folia sæpissime 10·0–17·0 × 3·5–4·5 cm.; costæ secundariæ utrinsecus circa 20, patulæ, juxta marginem arcuatæ, pag. sup. impressæ, pag. inf. parum eminentes; costulæ difficile aspectabiles; petioli 0·8–2·0 cm. long. Pedicelli circa 0·15 cm. long. Flores viridescentes. Calyx humectatus campanularis, in toto 0·25 cm. long.; lobi 0·2 cm. long. Corollæ tubus 0·15 cm. long.; lobi 0·2 × 0·14 cm. Filamenta 0·2 cm long. vel paullulum ultra; antheræ 0·15 cm. long. Staminodia circa 0·065 cm. long. Ovarium 0·225 cm., stylus 0·2 cm. long.

Distinguished by the oblanceolate leaves with their peculiar clothing beneath, the obtuse anthers, small acuminate staminodes, &c.

Ebenaceæ.

Euclea Eylesii Hiern, sp. nov. Frutex pumilus plurimum glaber dioicus, ramulis gracilibus pallide viridibus subglaucescentibus minute glanduliferis foliosis, foliis linearibus apice acutis vel subobtusis apiculatis basim versus angustatis subsessilibus vel breviter petiolantibus rectis vel subfalcatis sæpissime oppositis nonnunquam suboppositis alternisve patulis integris coriaceis glabris glandulis sessilibus parvis minio-rubris utrinque aspersis 3–5 cm. longis 2–4 mm. latis; floribus femineis tetrameris 3 mm. longis 2·5 mm. latis in cymulis axillaribus sæpe oppositis plerumque trifloris ± 6 mm. longis bracteolatis aggregatis, pedunculo communi 3–5 mm. longo, pedicellis 1–2 mm. longis lateralibus patulis, bracteolis subulatis circiter 1·5–2 mm. longis caducis, calyce subhemisphærico breviter lobato pallide viridi coriaceo glabro extus minute glandulifero 1 mm. longo 1·5 mm. lato lobis obtusis vel

subapiculatis, corolla campanulata vel poculiformi ochroleuca 2·5 mm. longa 2·5 mm. lata glabra vel setulis paucis extra ducta profunde quadrifida segmentis obovato-rotundis sinistrorse (ut desuper visis) contortis 2 mm. longis 2 mm. latis, staminodiis 0, pistillo 2 mm. longo, ovario ovoideo-globoso minute glanduloso-tomentello cum simul setis erectis crassis albidis hispido 1 mm. longo 1 mm. lato 4-loculo, stylis 2 erectis contiguis glabris carnosis apice lobulatis 1 mm. longis, stigmatibus marginalibus, ovulis solitariis.

Hab. Sebakwe, Mashonaland; *F. Eyles*, 44.

The male plant and the fruits of the female plant are at present unknown.

The species in general appearance resembles *E. linearis* Zeyh., but it is readily distinguished from it by the deeper lobing of the corolla.—W. P. H.

E. urijiensis Hiern in Journ. Bot. xxxiii. 179.

Toro, forest near mouth of Mpanga; *Bagshawe*, 1172.

I can see no difference between this and the recently published *E. latidens* Stapf.

Oleaceæ.

Jasminum abyssinicum DC. Prod. viii. 311.

Hoima Road, Entebbe; *Bagshawe*, 806.

Specimens belonging to two distinct species have been included under this name. The two are easily distinguishable by the corollas, which, in the one case (Abyssinia, Salt), are a full inch in length, while in the other (*Schimper*, 169 and 915; *Volkens*, 770, and others) they reach only half-an-inch or very little more.

J. abyssinicum R. Br. in Salt, Abyssinia App. lxiii. is a *nomen nudum*. The type specimen, which is in the National Herbarium, seems to Mr. Britten and myself not different from *J. mauritianum* Bojer, already known from various parts of the Nile land botanical province of Africa. Since no description of the true *J. abyssinicum* was issued previously to the Prodromus citation given above, that name must stand upon the authority of A. P. de Candolle.

Schrebera mazoensis, sp. nov. Arbor ramosa ramulis ultimis pedunculis pedicellis calycibusque dense lutescenti-griseo-pubescentibus, foliis imparipinnatis bijugis foliolis parvulis oblanceolato-obovatis obtusissimis basi cuneatim angustatis utrinque puberulis membranaceo-coriaceis rhachi angustissime alata puberula in nodis griseo-pubescente, floribus in cymis brevibus semel vel bis trichotomis ramulos coronantibus folia æquantibus vel superantibus digestis, pedicellis calyce multo brevioribus, bracteis parvulis oblongis obtusis dense pubescentibus, calyce parvo turbinato-campanulato breviter necnon inæqualiter dentato, corollæ tubo cylindrico glabro calycem 4-plo excedente lobis tubum semiæquantibus late obovatis apice retusis margine apicem versus crenulatis intus prope fauces fuscobarbellatis, capsula ——.

Hab. Mazoe; *F. Eyles*, 202.

"Tree 20–40 ft." sec. cl. detectorem. Foliorum rhachis 1·0–3·5 cm. long., pars proximalis basi leviter dilatata ibique circa

0·15 cm. lat., alibi 0·1 cm. vel minus; foliola modice 3·0–3·5 cm. long., sub apice ± 1·5 cm. lat., exstant minora equidem 2·0 × 0·8 cm.; costæ secundariæ utrinque circa 6, costulæ prominulæ, eleganter reticulatæ. Cymæ 3·0–4·0 cm. diam. Flores albi vel dilute punicei. Calycis tubus 0·25 cm. long., 0·28 cm. lat. Corollæ tubus 1·0 cm. long., humectatus basi 0·22 cm. faucibus 0·35 cm. lat.; lobi 0·5–0·6 cm. long. Antheræ subinclusæ. Ovarium apice puberulum; stylus glaber, sursum dilatatus, 1·15 cm. long.

Known from its allies among other points by the small leaflets with only the slightest trace of a wing to the rhachis of the leaf, and the extremely small calyces.

Apocyneæ.

Landolphia ugandensis Stapf in Dawe, Bot. Miss. Uganda Prot. tab. 3.

Forest near mouth of Mpanga, Toro; *Bagshawe*, 1184.

Flowers yellow in bud, white when open, fragrant. Fruit light green with golden spots.

Pleiocarpha Bagshawei, sp. nov. Frutex scandens, glaber, foliis oppositis vel 3–4-nis lanceolato-oblongis apice cuspidatis ipso obtusis basi in petiolum brevem breviter angustatis papyraceis costis secundariis utrinque plurimis patentibus pag. sup. olivacea facile pag. inf. dilute viridi difficile aspectabilibus, cymis axillaribus sessilibus paucifloris, calycis lobis ovato-oblongis obtusis vel leviter emarginatis, corollæ tubo quam calyx fere 4-plo longiore faucibus parum dilatato limbi lobis obovatis obtusissimis tubum vix semi-æquantibus, filamentis paullo infra fauces insertis antheris oblongis loculis basi obtusis, ovario ovoideo glabro e carpellis 2 inter se liberis sistente, ovulis quove in loculo 2.

Hab. Durro Forest, Toro; *Bagshawe*, 1086.

Foliorum limbus margine leviter revolutus, 10·0–12·0 cm. long., 3·5–4·0 cm. lat.; costa centralis fac. sup. impressa fac. inf. valde eminens; petioli 0·5–1·0 cm. long., crassiusculi, supra canaliculati. Cymæ circa 1·5 cm. diam. Flores albi. Calyx totus 0·25 cm. long.; lobi 0·17 × 0·12 cm., crassiusculi. Corolla tota 1·3 cm. long.; tubus intus sursum pilosus, 0·9 cm. long., medio 0·125 cm. superne 0·175 cm. lat.; lobi 0·4 cm. long., 0·3 cm. lat. Ovarium 0·12 cm. long. Stylus glaber, 0·3 cm., stigma 0·06 cm. long.

According to Dr. Stapf's clavis (Fl. Trop. Afr. iv. sect. i. 97), this must be inserted next to *P. bicarpellata* Stapf, but the leaves of Dr. Bagshawe's plant are somewhat different in shape, and often ternate or quaternate, the calyx-lobes are larger and broader, the corolla-tube broader and the lobes also broader and shorter. It might easily be mistaken at a first view for *P. Welwitschii* Stapf, a species which, however, on account of its short corollas with small lobes, is placed in another part of the genus.

Gabunia odoratissima Stapf in Journ. Linn. Soc. xxxvii. 526.

Hab. Mpanga Forest, Toro; *Bagshawe*, 999.

Dr. Stapf himself kindly named for me this recently published species. The type specimen was found in Western Ankole.

Conopharyngia Holstii Stapf in Fl. Trop. Afr. iv. sect. i. 146.
Toro, in swampy ground near Isunga ; *Bagshawe*, 1079.
A tree with white flowers.

The upper of the two pairs of leaves on the specimen are those of typical *C. Holstii* ; the lower pair are larger and broader, and approach in this character *C. pachysiphon* Stapf. With all the material now to hand there seems good reason to unite these two into one, of which *C. Holstii* is the eastern and *C. pachysiphon* the western form. It is not without interest to note that the Uganda specimens, intermediate as they are in locality, are also intermediate between the extreme forms.

Funtumia latifolia Stapf in Fl. Trop. Afr. iv. sect. i. 192.
Hab. Mpanga Forest, Toro ; *Bagshawe*, 1011.

Asclepiadeæ.

Tacazzea Bagshawei S. Moore in Journ. Bot. 1906, 88.
Mpanga River, Toro ; *Bagshawe*, 1060.
The type specimen was gathered by Dr. Bagshawe at Entebbe.

Raphionacme Bagshawei, sp. nov. Summum spithamea caule e caudice longe tuberoso crasso erecto gracili primo minute pubescente deinde glabro, foliis subsessilibus oblongis obtusis basi breviter angustatis utrinsecus in nervis puberulis margine albo-ciliolatis, cymis axillaribus sessilibus laxis paucifloris, pedicellis flores excedentibus gracilibus ut calyx et corolla griseo-puberulis, calycis lobis abbreviatis lanceolatis acutis, corollæ mediocris tubo medio levissime dilatato calyci longiore limbi lobis oblongis obtusis mox patentibus demum recurvis, coronæ phyllis quadratis apice cuspidulatis inde in appendicem filiformem elongatam exeuntibus, filamentis coronæ phyllis insertis applanatis antheris magnis conniventibus late ovatis obtusis, stigmate incrassato late breviterque conoideo, folliculo ——.

Hab. Unyoro, above Kibero on Lake Albert ; *Bagshawe*, 910.

Caudex summum 18·0 cm. long., hujus pars infera 10·0 cm. metiens in tuber circa 1·5 cm. diam. dilatata. Folia 2·0–3·0 cm. long., 0·5–0·7 cm. raro 1·0 cm. lat., in sicco olivacea, pag. sup. microscopice lepidota. Pedicelli sub floribus profecto evolutis sæpissime 1·0–2·5 cm. long. Flores albi viola tincti. Calyx 0·2 cm. long. Corollæ tubus 0·3 cm. long., 0·25 cm. diam. ; lobi ægre 1·0 cm. long. Coronæ phyllarum pars quadrata 0·15 cm. long., cuspis 0·08 cm., appendix filiformis 0·7 cm. Filamenta partis quadratæ apici inserta, 0·2 cm. long. ; antheræ 0·15 cm. long. et lat. Styli basis nuda attenuata, 0·3 cm. long., gynostegium 0·25 cm.

Mr. N. E. Brown, who kindly looked at this rather remarkable plant for me, considers it to be nearest *R. splendens* Schlechter, although the differences between the two are many and considerable. The most noteworthy feature about *R. Bagshawei* is that the filaments are attached to the coronal leaves for some little distance, so that they do not leave them till quite at the top of their quadrate lower portion, instead of arising from the tube of the corolla or from the base of the coronal leaf.

Chlorocodon Whytei Hook. fil. in Bot. Mag. sub t. 5898.
In river-bed at Mazoe; *Eyles*, 204.

Secamone zambesiaca Schlechter in Journ. Bot. 1895, 303.
Butiaba Plain, east shore of Lake Albert; *Bagshawe*, 852.

S. platystigma K. Schum. in Engl. Bot. Jahrb. xvii. 143.
Near Kafu River, Uganda; *Bagshawe*, 958.

Schizoglossum angustissimum K. Schum. in Engl. Bot. Jahrb. xvii. 123.
Hoima Road, Entebbe; *Bagshawe*, 809.
Dist. Central Africa from Niamniamland to Nyassaland.

S. eximium N. E. Br. in Fl. Trop. Afr. iv. 370.
Toro, near Misisi River; *Bagshawe*, 966.
"Herb three feet high. Flowers have unpleasant smell."

S. Carsoni N. E. Br. in Fl. Trop. Afr. iv. 366.
Mazoe; *Eyles*, 216.

Asclepias Phillipsiæ N. E. Br. in Kew Bull. 1895, 219.
Near Fort Portal, Toro; *Bagshawe*, 985.

A. Schweinfurthii N. E. Br. in Kew Bull. 1895, 253.
Fort Portal; *Bagshawe*, 1014.

A. fulva N. E. Br. in Kew Bull. 1895, 254.
Near Wimi River, Toro; *Bagshawe*, 1041.
A very fine plant of straggling habit, upwards of four feet in height. Stem stoutish, leafless at its lower half. Root not seen.

A. denticulata Schlechter in Journ. Bot. 1895, 334.
Valley of Kafu, Uganda; *Bagshawe*, 826.

A. reflexa Britt. & Rendle in Trans. Linn. Soc. Bot. ser. 2, iv. 28, *in not.*
Sebakwe; *Eyles*, 169.

A. lineolata Schlechter in Journ. Bot. 1895, 336.
Sebakwe; *Eyles*, 166.

Cynanchum altiscandens K. Schum. in Abhand. Preuss. Akad. Wiss. 1894, 64.
East Toro, at 4500 ft.; *Bagshawe*, 1105.

Tylophora sylvatica Decne. in Ann. Sc. Nat. Sér. II. ix. 273.
North of Kakumiro, Uganda, and East Toro; *Bagshawe*, 951 and 1105.

Ceropegia albertina, sp. nov. Planta glabra caule volubili incrassato laxe foliato, foliis brevipetiolatis late ovatis basi cordatis apice brevissime cuspidulatis crassiusculis saltem in sicco margine leviter undulatis, cymis axillaribus pedunculatis pauci- (circa 5-) floris, pedunculis crassiusculis folia æquantibus vel subæquantibus, floribus mediocribus pedicellatis glabris fusco-rubris, calycis alte partiti lobis lanceolatis acuminatis, corolla prope basin curvata sursum infundibulari ad $\frac{1}{3}$ lobata tubo medio paullo constricto intus pilosulo lobis lineari-lanceolatis apice connatis, coronæ phyllis exterioribus inferne connatis obcordatis ut phylla interiora anguste ligulata et elongata gynostegium superantibus, polliniis subsphæ-

roideis interne marginatis caudiculis brevibus latis glandula dolabriformi polliniis breviore, stigmate plano.

Hab. Butiaba Plain, west shore of Lake Albert, alt. 2200 ft.; *Bagshawe*, 848.

Folia circa 2·0 × 0·15 cm., glandulis pellucidis creberrimis donata, costæ secundariæ utrinque 4, tenuissime ut costulæ venuste reticulatæ sub lente valde perspicuæ; petioli 0·5 cm. long., crassiusculi. Pedunculi 1·5–2·0 cm. long., pedicelli 0·5–0·7 cm. Calycis lobi 0·25 cm. long.; glandulæ interstitiales deltoideæ, integræ vel 2·3-lobulatæ, 0·05 cm. long. Corolla tota humectata 2·3 cm. (sicca equidem 2·0 cm.), lobi 0·75 cm. long.; tubus inferne et superne 0·5 cm. diam., medio 0·4 cm. Coronæ exterioris pars connata 0·1 cm. long., ejus lobi 0·12 cm.; phylla interiora 0·13 cm. long. Pollinia 0·03 long. Folliculi ——.

A very well-marked species, in habit somewhat like *C. distincta* N.E. Br., but with much smaller leaves and quite different corollas.

Loganiaceæ.

Strychnos (§ Intermediæ) **myrcioides**, sp. nov. Frutex ecirrhosus inermis crebro ramosus glaber ramulis subintricatis gracilibus ad nodos aliquanto tumidis bene foliosis, foliis parvis oblongis vel oblongo-oblanceolatis obtusis apice ipso mucronulatis basi in petiolum brevem cuneatim coartatis coriaceis in sicco utrinque sat læte viridibus fac. sup. nitidulis basi (costa inframarginali paullo minus perspicua parum arcuata neglecta) 3-nervibus costis reliquis secundariis utrinque 7–12 sæpissime ad angulum fere rectum costæ centrali applicitis costis costulisque (his laxe reticulatis) utrinsecus eminentibus, floribus in cymis axillaribus (raro terminalibus) brevibus a basi furcatis corymbo-paniculatis haud congestis quam folia brevioribus minute pubescentibus dispositis, pedicellis subnullis, bracteis parvulis lanceolatis acutis, floribus 5-meris, calycis lobis quam corollæ tubus paullo brevioribus rotundato-ovatis obtusissimis margine ciliolatis, corollæ ad ½ divisæ tubo cylindrico intus faucibus pilosis lobis triangulari-lanceolatis obtuse acutis, ovario septo fere evanido-loculari, bacca cruda parva subsphæroidea paucisperma.

Hab. Butiaba Plain, east shore of Lake Albert; *Bagshawe*, 841.

Foliorum limbus 2·0 (raro 1·5)–4·0 × 1·0–2·0 cm.; petioli circa 0·2 cm. long., subtus tumidi et albi. Cymæ summum 1·0 × 1·5 cm. Bracteæ ± 0·1 cm. long. Flores galbani. Calyx 0·15 cm. long., fere 0·2 cm. lat. Corolla tota 0·4 cm. long.; tubus 0·2 cm. long. et totidem lat.; lobi 0·2 × 0·075–0·1 cm. Filamenta 0·035 cm. long.; antheræ subexsertæ, 0·06 cm. long. Ovarium ovoideum, ægre 0·1 cm. long. Bacca sicca 0·8 × 0·7 cm., glabra, subnitida, in sicco minute rugulata.

The inframarginal pair of nerves are often almost or quite as strongly pronounced as the other basal pair. They run straight for a short distance—less than a centimetre—then they repeatedly arch, running all the while almost upon the edge of the leaf. Not far from the leaf's apex they become indistinguishable. The small

branches they receive, all the way up, from the other pair are numerous and very prominent.

In foliage this is much like *S. Atherstonei* Harv., but the leaves are usually somewhat larger and more conspicuously nerved; also the inframarginal nerves are much stronger. The flowers of *S. Atherstonei*, however, are quite different.

(To be continued.)

SOME SPANISH AND BALEARIC PLANTS.

By Cedric Bucknall, Mus. Bac. Oxon.

The following is a list of the more noteworthy plants collected by Mr. J. W. White and myself in the Balearic Islands, between April 23rd and May 5th, 1903, and between Aug. 3rd and 17th, 1904; and in Spain, by myself, between April 13th and 28th, 1904, and between Aug. 24th and Sept. 6th, 1905.

On these occasions we gathered a large proportion of the endemic Balearic plants, besides a considerable number of those common to the Mediterranean region. On our return from Majorca to Barcelona in August, 1904, we spent a short time on Montserrat, which I had also visited in the preceding spring, on each occasion finding some of the rarer plants of that beautiful and interesting mountain. We are much indebted to the late Señor J. J. Rodriguez, of Mahon, who has contributed so much to our knowledge of Minorcan plants, and has discovered so many rare endemic species, for introducing us to several gentlemen of that town who are interested in botany, amongst them to Señor A. Pons, without whose kind assistance, on both our visits, we should have been unable, in the short time at our disposal, to reach the stations of several of the rarer and more inaccessible plants.

Our thanks are also due to Mr. Clarence Bicknell, of Bordighera, for his kind and valuable assistance in planning our tours, and for the loan of books and maps.

To avoid repetition I give a list of the localities visited. In Minorca: The neighbourhood of Mahon and Villacarlos, the Cala Mesquita, the Albufera, the Isla Colom, the Barrancos of Algendar and la Val. In Majorca: Porto Pi and Torre den Pau, near Palma; Soller Port, Couma de Mameliouda, Barranco de Soller, the Val de Ternellas and Ariant near Pollenza, the Monastery of Lluch, and the mountain route through the Gorg Blau to Soller, and Miramar. In Spain I visited Pozuelo, near Madrid; Guadalajara, Aranjuez, Alicante, Elche, the coast near Valencia and the valley of the Turia, El Desierto de las Palmas and Benicasim, near Castellon; Oropesa, Tarragona, Barcelona, and Montserrat.

The species which I believe to be unrecorded for the Balearic Islands are distinguished by an asterisk, and those which are peculiar to those islands, or to the Iberian Peninsula, by the sign †;

in the case of plants which are also found in other parts of the Mediterranean region, the names of the countries or islands are added in brackets.

Ranunculus macrophyllus Desf. Near the Barranco de Algendar. A fine plant with large handsome flowers. According to Nyman it ranks as a subspecies of *R. palustris* L. The Sicilian plant (*R. heucherifolius* Presl) has smaller flowers and is less hairy. (Spain.)

†*Helleborus lividus* Ait. Couma de Mameliouda. Very different in appearance from the Corsican plant, *H. corsicus* W.

Delphinium pictum Willd. (*D. Requieni* DC.). Hillside on the way from Pollenza to Ariant. (Iles d'Hyères, &c.)

Pæonia corallina Retz, var. †*Cambessedesii* Willk. Barranco de Algendar.

†*Malcomia patula* DC. Pozuelo. The plants from this locality were found along the course of a small stream which flows from Pozuelo to the river Manzanares.

†*Brassica balearica* Pers. On rocks near the Col de Lofra, above the Barranco de Soller.—†*B. lævigata* Lag. Pozuelo.

†*Diplotaxis virgata* Cav. Bank of the Tagus near Aranjuez.

†*Alyssum granatense* Boiss. & Reut. Low hills near the Manzanares, Madrid.

Carrichtera Vellæ DC. Cultivated land, Porto Pi, *Mr. J. W. White.* (Sicily, Greece, &c.)

Rapistrum Linneanum Boiss. & Reut. Between Palador and Palma, *J. W. W.* (France, Spain.)

†*Iberis subvelutina* DC. Dry hills, Aranjuez.

†*Lepidium subulatum* L. Aranjuez.—†*L. Carrerassii* Rodr. Mahon.

Helianthemum umbellatum Mill. Near Torre den Pau. Cabo de Salou, near Tarragona. (France, Greece.)—†*H. asperum* Lag. Hills near Guadalajara.—†*H. squamatum* Pers. Aranjuez.—*H. Serræ* Camb. (*H. origanifolium* var. Nyman). Sandy shore near Torre den Pau. (Spain.)

†*Viola Jaubertiana* Mar. & Vig. On rocks in the Gorg Blau. A remarkable species, with thick leathery leaves like those of the ivy. —*V. stolonifera* Rodr. Barranco de Algendar. Allied to *V. odorata*, but larger in all its parts, and with very long stolons.—†*V. Wilkommii* R. On rocks, Montserrat.

†*Frankenia Reuteri* Boiss. Aranjuez.

Silene velutina Pourr. (*S. mollissima* S. & S.) Gorg Blau. (Corsica.)

†*Gypsophila Struthium* L. Aranjuez. Very abundant along the side of the railway.

†*Dianthus Broteri* Boiss. Rocky hills, Alicante.

†*Cerastium dichotomum* L. Cultivated land between Pozuelo and Madrid.

Spergularia campestre Willk. Villacarlos and Mahon. (Spain, Greece.)

†*Malva minoricensis* Rodr. (*Lavatera minoricensis* Camb.). Cala Mesquita.

†*Hypericum Cambessedesii* Coss. On the dry bed of the Torrente Malluch, Lluch, where it follows the course of the stream for many

miles. Gorg Blau, Barranco de Soller. — *H. balearicum* Camb. Found in flower in April in the Val de Ternellas, and in August at Lluch. (Liguria.)—†*H. ericoides* L. Near Valencia, whence it is exported to Marseilles for medicinal purposes.

†*Erodium Reichardii* DC. Gorg Blau. "Distinctissima et rara species." (*Nyman*).—†*E. supracanum* L'Hérit. Montserrat.

†*Rhamnus balearicus* Camb. Val de Ternellas.—†*R. lycioides* L. Cabo de Salou, near Tarragona.

†*Retama sphærocarpa* Boiss. Between Pozuelo and Madrid.

†*Ononis hispanica* L. fils. Rocky hills, Alicante.—*O. crispa* L. Near Mahon. (Spain.)

†*Lotus tetraphyllus* L. fils. Barranco de Algendar.

†*Hippocrepis balearica* Jacq. Miramar.

†*Astragalus chlorocyaneus* Boiss. & Reut. Road to Kals, Tarragona.

†*A. Poterium* Vahl. Near Mahon, Val de Ternellas.

**Vicia lanciformis* Lange, Fl. Hisp. No. ? 3605, Val de Ternellas, April, 1903. The only stem which was gathered is 4 dcm. long, with leaves 7·5 cm. long, all having five pairs of narrowly linear-lanceolate leaflets attaining 3·5 cm. in length, which are gradually attenuated to an acute point without the slightest tendency to become truncate or retuse; stipules semisagittate, without teeth; pods 3·5 cm. long, with a few scattered hairs. Lange's plant differs in the lower leaves having one pair of leaflets and the upper ones four pairs; in the stipules having two teeth at the base, and in the substance of the leaves being "almost pellucid." It appears to be a little known plant, marked as a doubtful species by Willkomm, and united by Nyman to *V. angustifolia*, from which it differs in the long, equally attenuated leaflets, and in the calyx-teeth exceeding the tube.—†*V. bifoliata* Rodr. Cala Mesquita.

**Rubus cæsius* L. In the hedge of a lane leading to a hamlet between Soller and the port, May, 1903.

Cucumis Colocynthis L. On the sea-coast, Benicasim. (Granada, Murcia, Greece.)

Paronychia serpyllifolia DC. Montserrat. (France, N. Italy.)

Mesembryanthemum crystallinum L. Cala Figuera, Mahon. (Spain, Italy, &c.)—*M. nodiflorum* L. Cala Figuera, Mahon. (France, Spain, &c.)

†*Saxifraga catalaunica* Boiss. & Reut. Montserrat.

†*Guillonea scabra* Coss. Near the Monastery, El Desierto de las Palmas.

†*Pastinaca lucida* L. (Camb.). Couma de Mameliouda, Barranco la Val. "Species pulchra, spectabilis, egregia" (Nyman). The Corsican plant is *P. latifolia* DC.

Kundmannia sicula DC. *Brignolia pastinacæfolia* Bert. Miramar. (Bœotia, Corsica, Sicily, &c.)

Bulbocastanum incrassatum Lge. Near Palma, *J. W. W.* (Bœotia.)

†*Pimpinella Bicknelli* Briquet. Ariant, near Pollenza. We were guided to the only known station of this distinct and interesting species by Raphael Muraghes, of Pollenza, who assured us that we were the only botanists who had visited the spot since its discovery by Mr. Clarence Bicknell.

†*Bupleurum Barceloi* Coss. On a bank near the top of the Barranco de Soller.—†*B. angulosum* L. (*B. pyrenæum* Gou.) Above the Monastery, Montserrat. *B. fruticescens* L. and the fine *B. fruticosum* L. are also abundant on this mountain.

Lonicera Periclymenum var. †*hispanica* Boiss. & Reut. Pozuelo.

Rubia peregrina var. †*balearica* Willk. Val de Ternellas.

†*Galium fruticescens* Cav. Montserrat.

Centranthus orbiculatus Dufr. Barranco de Soller. A very distinct-looking plant, but united to *C. Calcitrapa* by Nyman.

†*Cephalaria balearica* Coss. Barranco de Soller.

†*Senecio Rodriguezii* Willk. Cala Mesquita.

Artemisia herba-alba Asso. Aranjuez. (France.)

†*Helichrysum Lamarckii* Camb. Rocks at the Col de Lofra, above the Barranco de Soller.

Bellium bellioides L. On the coast near Mahon. (Corsica, Sardinia.)

†*Pulicaria hispanica* Boiss. Pozuelo.—*P. dysenterica* var. *hispanica* Willk. (*P. uliginosa* Stev. ?) Pozuelo. (Greece, Turkey, &c.)

†*Centaurea dracunculifolia* Dufr. Marshy ground near the sea, Valencia.

†*C. hyssopifolia* Vahl. Aranjuez. — †*C. linifolia* Vahl. Near Tarragona. — †*C. Jacobi* Dufr. On the sandy sea-shore near Valencia, with *C. sonchifolia* L., from which it scarcely differs, except in the branches bearing several heads, and in the entire radical leaves.

†*Hieracium Lychnitis* Scheele. Montserrat.

†*Barkhausia Triasii* Camb. Barranco de Soller. Roadside between Palma and Soller.

†*Crepis montana* Willk. Val den March, near Pollenza.

Zollikoferia resedifolia Coss. Alicante. (Sicily.)

Campanula speciosa Pourr. Montserrat. (France.)

Ambrosia maritima L. "Huerta de Valencia." (Italy, Greece.)

†*Erythræa Barrelieri* Dufr. (*E. major* Hfgg.) Near Tarragona.—†*E. gypsophila* Boiss. & Reut. Aranjuez.—*E. maritima* Pers. var. *erubescens* Willk. Porto Pi, *J. W. W.*

†*Digitalis dubia* Rodr. Val de Ternellas.

†*Antirrhinum Barrelieri* Bor. El Desierto de las Palmas, Castellon.

†*Linaria filifolia* Lag. Pozuelo.

Sibthorpia africana L'Hérit. Barranco de Algendar. (Crete, &c.)

†*Odontites longiflora* Vahl. Low hills, Aranjuez.

†*Ceratocalyx macrolepis* Coss. Cabo de Salou, Tarragona.

†*Teucrium lancifolium* Boiss. Torrente de Malluch, Lluch.—†*T. subspinosum* Pourr. (*T. balearicum* Coss.) Gorg Blau.—†*T. buxifolium* Schreb. Rocky hills, Alicante.

Lavandula dentata L. Belver, Palma. (Spain, Sicily?)

†*Scutellaria Vigineixii* Mar. (*S. balearica* Barc.) Couma de Mameliouda, Soller.

†*Micromeria marifolia* Benth. On rocks, El Desierto de las Palmas. — *M. filiformis* Benth. Val de Ternellas, Barranco de

Soller. (Corsica.) — †*M. Rodriguezii* F. & J. Barranco de Algendar.

†*Lysimachia minoricensis* Rodr. Barranco la Val. The only known locality.

†*Anagallis linifolia* L. Pozuelo.

†*Cyclamen balearicum* Willk. Abundant in many localities.

Statice serotina Rchb. (*S. Limonium* var. *macroclada* Boiss.) Benicasim. (France, Italy.) — *S. ovalifolia* Poir. Coast between Mahon and Villacarlos. In the palm-groves at Elche, near Alicante. There are specimens of the Mahon plant in the herbaria at Kew and South Kensington, collected by Porta and Rigo, named *S. lychnidifolia* Gir., but they differ greatly from that species as described, and from specimens gathered at Gruissan, France, in company with Mr. C. E. Salmon, and so named by him. The Mahon plant attains 4 dcm. in height, and has broadly rhomboid-ovate leaves rather suddenly contracted into a winged petiole, 5 cm. long, and an open panicle with long branches and short spikes. The Elche plant attains 6 dcm. or more, with leaves of the same general outline, but much longer in proportion to the breadth, reaching 12 cm. long. In other respects the two plants are so similar that I have little hesitation in naming them both as above. —*S. Girardiana* Guss. On the seashore, Benicasim. (France.)—*S. Gougetiana* Gir. On the rocky coast between Mahon and Villacarlos. This agrees well with specimens collected at Ciudadela, Minorca, by Porta and Rigo. (Naples, Africa.)—*S. confusa* G. & G. On the seashore, Benicasim. (France, Italy, &c.)—*S. duriuscula* Gir. With *S. virgata* on the roadside between Alayor and the Barranco la Val, several miles from the sea. (France, Spain.)—†*S. salsuginosa* Boiss. Bot. Voy. en Espagne, t. 155 B. On the sandy seashore south of Alicante. A small species resembling *S. delicatula* in miniature.—*S. delicatula* Gir. Boiss. *l. c.*, t. 155 A. On the seashore close to the town of Alicante, where it must soon become extinct.—*S. minutiflora* Guss. Porto Pi. Agreeing with specimens in the Kew Herbarium collected at Soller Port by Bourgeau. (Italy, Sicily.)—*S. virgata* W. Porto Pi, where it is very abundant, and attains a large size. Also on the coast at Cala Mesquita, Barranco la Val, and in Spain at Valencia, Oropesa, and Benicasim. (France, &c.)—*S. minuta* L. On rocky ground, Porto Pi, forming large tufts. (France, Spain.)—†*S. furfuracea* Lag. On the rocky coast north of Alicante.—†*S. dichotoma* Cav. At the foot of the hills at Aranjuez. This beautiful plant is also abundant along the railway near that town.—*S. echioides* L. On low hills near Aranjuez. On the coast at Oropesa.—*S. ferulacea* L. The Albufera, near Mahon. (France, Spain.)

†*Atriplex glauca* L. (*Obione glauca* Moy.) On the seashore, Alicante.

Emex spinosa Camp. Cultivated ground, Palma. (Calabria, Greece, &c.)

†*Rumex papillaris* Boiss. & Reut. Pozuelo.

†*Daphne vellæoides* Rodr. Isla Colom, Minorca.

Buxus balearica Lam. Barranco de Soller. (Granada, Sardinia.)

†*Euphorbia polygalæfolia* Boiss. & Reut. Roadside on the way to Kals from Tarragona.—†*E. flavopurpurea* Willk. El Fuente den Simon, Mahon. — †*E. medicaginis* Boiss. Abundant in cultivated ground and on the roadside between Palma and Soller.—†*E. imbricata* Vahl. var. *β. angustifolia* Willk. Illus. ii. t. clxvi. f. ii. Roadside near Pollenza. Soller Port. Abundant in cultivated ground at Lluch. — †*E. imbricata* Vahl. var. *γ. parvifolia* Willk. *l. c.*, f. iii. Cala Mesquita. These two varieties with var. *α. latifolia* Willk. and *E. Pithyusa* L. constitute a group of forms differing greatly in habit, but closely related in structure. In all the forms the involucral glands are semilunate, with almost obsolete cusps; the seeds are faintly rugose, mottled, and, like the surface of the entire plant, are minutely papillose from the projection of the cells of the epidermis. On the upper surface of the leaves the papillæ are hemispherical, and on the under surface and the younger parts of the stem they are elongated to two or three times their diameter, and are cylindrical and obtuse, giving a glaucous, minutely shagreened appearance to the plant.* The leaves are coriaceous and rigid, with a strong tendency to become involute, but differ much in form and size, and in the character of the margin, which varies from entire to erose or strongly dentate. The forms may be arranged as follows † :—

A. Plant erect, attaining 30–40 cm., with long branches and loosely imbricated leaves :—1. Leaves obcuneate oblong, 25–30 mm. × 10–12 mm., closely or obsoletely serrate in the upper half = *E. imbricata* var. *α. latifolia* Willk. 2. Leaves lanceolate or obovate-lanceolate, closely serrulate or subentire in the upper half, 12–20 mm. × 3–5 mm. = var. *β. angustifolia* Willk.

B. Plant erect or decumbent, 10–30 cm., with short crowded branches and densely imbricated leaves :—1. Stem and branches, or at least the branches, erect, stout; leaves lanceolate, acute, entire, 15 mm. × 4–5 mm. = *E. Pithyusa* L. 2. Stem decumbent or ascending, slender, much branched from the base; leaves obovate-oblong or obcuneate, obtuse or truncate, mucronate, strongly serrate-dentate at the apex = var. *γ. parvifolia* Willk.

A plant gathered by Mr. Clarence Bicknell as *E. Pithyusa* on the coast at Calcatoggio, Corsica, has elliptic, acuminate, eroso-dentate, flat leaves, 15 mm. × 7 mm., which are of a thinner texture, and show the veins; it would be better placed near *E. imbricata* var. *latifolia*, as in *E. Pithyusa* the leaves appear to be always entire, with involute margins. A specimen of *E. Pithyusa* var. *procera* G. & G. (*E. bonifaciensis* Req.) in the herbarium of Mr. J. W. White, from Bonifacio, Sardinia, has acute entire leaves, 21 mm. × 5 mm., and resembles *E. imbricata* var. *lanceolata*. Grenier and Godron's description of this variety is: "Upper cauline leaves oval

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* In *E. nicæensis* also the leaves are papillose, but the papillæ are conical and acute, and give the plant a softer, more velvety appearance.

† The descriptions and measurement of the leaves are partly taken from Willkom. Illus. ii. p. 129.

or lanceolate; plant higher, with stronger and straighter stems." Lastly, specimens of *E. Pithyusa*, gathered by Mr. J. W. White and myself on the coast at S. Maxime, near Fréjus, and at Port Vendres, have several stout decumbent or ascending stems from the same root, which bear umbels of stout branches with densely imbricate, acute, entire leaves, 15 mm. × 4·5 mm. Several weak plants of this which were gathered in April might be easily taken for *E. imbricata* var. *parvifolia*.—*E. Chamæsyce* L. Lluch. (France, Spain, &c.) — **E. prostrata* Ait. (*E. perforata* Guss.). Between paving-stones in the streets of Villacarlos, where it was pointed out to us by Señor J. Andreu Gahona. It is recorded as *E. Chamæsyce* L. by Rodriguez in the still unpublished *Florula de Menorca*, but the transversely sulcate seeds and the connate stipules clearly distinguish it from that species. It has been found in Sicily and Portugal, but has not, I believe, been hitherto identified in the Balearics. It is a native of tropical and subtropical America.

Urtica pilulifera var. †*balearica* L. Barranco de Algendar. (Sicily, Greece.)

Triglochin palustre L. In marshy ground near the sea, Valencia. Rare in the south of Spain.

Leucojum Hernandezii Camb. The Albufera, Minorca, Soller Port, Majorca. (Sardinia.)

Smilax aspera var. †*balearica* Willk. Val de Ternellas.

Asparagus horridus L. (*A. stipularis* Forsk.) Barranco la Val. (Spain, Sicily, &c.) — *A. albus* L. Soller, Porto Pi. (Spain, Sicily, &c.)

Dracunculus crinitus Schott. (*Arum muscivorum* L. fil.) Isla Colom, Minorca, where this strange-looking plant with its large lurid flowers is a troublesome weed.

†*Carex rorulenta* Porta. On rocks and under walls in the Couma de Mameliouda, Soller. Allied to *C. Halleriana* Asso, but very distinct in its widely creeping stems, slender habit, and in the under side of the leaves being sprinkled with "crystalline globules like dew." Porta describes the style as "bifidus," but Herr Kükenthal, to whom I submitted specimens, says this "ist wohl Fiction," as it has the usual three stigmas. The Couma de Mameliouda is probably a new station for this rare little sedge, as it does not appear to have been noticed since Porta discovered it on the Puig Mayor, Majorca.

Heteropogon glaber P. On the coast at Benicasim, Castellon. (France, Italy, &c.)

Echinochloa colonum P. B. Sandy seashore, Valencia. (South Italy, Sicily.)

Arundo Plinii Turr. On the bank of the Turia at the new waterworks near Valencia, where it grew with *Erianthus Ravennæ*, a large form of *Phragmites communis*, and fine clumps of *Arundo Donax*. (South France, Italy, &c.)

Sporobolus pungens Kunth. On the coast near the Barranco la Val. This occurs near Palma, but has not, I believe, been recorded for Minorca. (South France, Spain, Italy.)

NOTES FROM CORNWALL.

By W. Botting Hemsley, F.R.S.

The records of the colonization of *Cotoneaster microphylla* Wall. in various localities (see Journ. Bot. 1905, 244, 274) reminded me that in 1904 I found it at Fowey, growing over the rocks in the excavated road between Fowey and Menatilly, and near the former place. It was in fruit, and I brought away only a small specimen to verify the species.

Veronica angustifolia A. Rich., a native of New Zealand, I also found established on one of the abutments of the quaint old bridge of Lostwithiel. It brought to mind the fact that some six hundred species of aliens, largely British, have spread over New Zealand against this one that I lighted on in Cornwall. I do not mean by this that no other New Zealand plant has been found wild in this country; indeed, I remember having seen *Phormium tenax* outside of cultivation somewhere in West Cornwall.

I do not know whether anybody has examined the wild cabbage —I use the term generically here—that grows on the cliffs below the road leading from Fowey to Readymoney, and reported upon it. I had long been familiar with the appearance of the cabbage on Dover and Walmer cliffs, though I had not critically examined it, but it looks like a true cabbage as distinguished from a kale. The Fowey plant struck me as being quite different, and more like a kale, but I could not get specimens from the old plants, as they were on, to me, inaccessible parts of the cliff. I had this cabbage under observation for a month in 1904, and in 1905 I landed at Fowey for a few hours, partly to look at it again. As near as I could judge, looking down upon the plants, the largest were six to eight feet high, with stems six to eight inches thick near the base, much branched above, and bearing a heavy crop of pods. The leaves were long, curled, and pinnatifid, not round as in the Dover cabbage, and the flowers smaller. With regard to the size of the flower, there is a specimen in H. C. Watson's herbarium at Kew, from the cliffs west of Walmer, communicated by Miss Harvey, having petals an inch and a quarter long and half an inch wide; but this is doubtless an unusually luxuriant specimen.

The Fowey cabbage is not only perennial, but shrubby, I should say, the same stems flowering year after year. I think I am right in stating that the plants I saw in flower and fruit in 1905 were the same that I saw in flower in 1904. However, some local botanist may be able to give more exact information on this point, which is one of considerable interest. My impression is that some of the plants of the Fowey cabbage may be five or ten years old, or they may be even older.

Near Bodinnick, on the steep left bank of the Fowey, there is very luxuriant vegetation, due no doubt to the superficial springs which keep the banks and flats more or less saturated. Taking the road to the left of the landing-place from the ferry, there are some

open level spots on the otherwise steep banks, and there, in a sort of wild garden, I met with clumps of *Conium maculatum* between nine and ten feet high, with relatively thick stems. In the same place were foxgloves and *Scrophularia aquatica* upwards of seven feet high, and other plants of unusual vigour, including the colonized (*Enothera grandiflora* (syn. *O. Lamarkiana*).

A NEW *LIMONIA* FROM UGANDA.

By Edmund G. Baker, F.L.S.

Limonia (Citropsis) **ugandensis**, sp. nov. Frutex spinescens, spinis rectis patentibus quam rhachios parte posteriori brevioribus ; foliis sæpissime quinque-foliolatis imparipinnatis bijugis cum impari sessili ambitu subsimilibus iis *L. Preussii* Engler sed minoribus rhachi latissime alata ad nodos articulata et haud alata, foliolis elliptico-oblongis vel elliptico-obovatis coriaceis margine undulatis vel obsolete crenato-serratis nervis lateralibus supra inconspicuis subtus subprominentibus haud procul a margine conjunctis apice acutis utrinque attenuatis ; floribus axillaribus inflorescentia brevi sæpe circ. 6-flori ; calycis lobis 4 brevibus margine anteriori minutissime serrulato paullo inæquilongis ; petalis 4 albis punctatis valde imbricatis concavis rotundatis crassiusculis ; staminibus 8 in seriebus 2 instructis petalis brevioribus ; filamentis crassis antheris fere æquilongis ; ovario 4-loculari, stigmate crasso, stylo subnullo, ovulis in quoque loculo solitariis.

Ab *L. Schweinfurthii* Engler (mihi solummodo ex descriptione cognita) hac differt foliis quinquefoliolatis nec trifoliolatis ab *L. Preussii* Engler foliis minoribus et stylo subnullo ab *L. gabunensi* Engler petalis latioribus et foliolis haud apice longe attenuatis.

Hab. Toro, Mpanga Forest, alt. 4800 ft., *Dr. Bagshawe*, no. 1007, Herb. Mus. Brit.; South Buddu, *Dawe*, 399, Herb. Kew.

Spines 1·5–2·0 cm. long. Leaflets 7·0–11·0 cm. long, 3·5–4·7 cm. broad. Lowest internode of the rachis 4·5–6·0 cm. long, upper internode 3·0–3·5 cm. long. Pedicels rather thick, 2·0–3·0 mm. long. Calyx lobes 1·0–2·0 mm. long. Petals 6·0–8·0 mm. long. Filaments of longer stamens ± 2·0 mm. long. Anthers 2·0–2·5 mm. long.

It differs from both the species figured in Dr. De Wildeman's *Flore du bas et du moyen Congo* by the leaflets not being so attenuate at the apex.

This is the "*Citropsis* sp. nov. ?" of Mr. Dawe's Uganda list (p. 39) from South Buddu. It has lime-like fruits ± 2 cm. in diameter.

FREDERICK JUSTEN.

(WITH PORTRAIT.)

ALTHOUGH not strictly speaking a botanist, the late Frederick Justen was so well known to botanists and took so active and intelligent an interest in botanical literature that some notice of him may fitly appear in these pages; he was moreover a familiar figure at the meetings of the Linnean Society, of which he became a Fellow in 1886. Justen, who was born at Bonn, Feb. 29, 1832, came to England in 1851 and entered the firm of Dulau & Co., of which he ultimately became the sole proprietor. To this firm was added in 1863 the natural history business carried on at 45 Frith Street, Soho, by William Pamplin, who retired in that year and of whom an account will be found in this Journal for 1899. When the natural history collections of the British Museum were transferred from Bloomsbury to South Kensington, the formation of the new library was entrusted to Justen; in this his interest was by no means confined to the commercial aspect, and he was wont to regard with pride the fine collection of books in the Department of Botany, to which he made numerous donations—the last being the magnificent Codex of Dioscorides printed in facsimile and issued at Leyden in 1905; he was also much interested in the collection of drawings in the Department, to which he gave various additions.

Justen's principal service to botany, however, was the part he took in securing for the National Herbarium the splendid set of Welwitsch's Angolan plants, which ranks among the most valuable of its contents. In 1873, Welwitsch by his will, of which Messrs. Carruthers and Justen were appointed executors, directed that the study-set of these plants should be offered to the British Museum for purchase. The Portuguese Government, however, claimed the whole of the collections; the executors resisted this demand, and, at great pecuniary risk to themselves personally, defended a suit in Chancery. After nearly two years a compromise was arrived at, when the Portuguese Government agreed to give to the Museum the next best set after the study-set, which was sent to Lisbon, with a copy of all Welwitsch's notes and descriptions. This was duly carried out; the collection in the National Herbarium now represents Welwitsch's work more fully than that at Lisbon, as the latter has been in part distributed to other herbaria.

A man of much shrewdness, possessed of a fund of general information and a considerable knowledge of art and music, Justen was an interesting talker, and a good example of the type of man who, while thoroughly capable in business, was not absorbed by it to the exclusion of wider interests.

For the accompanying excellent portrait we are indebted to his friend and neighbour Mr. Cribb, who is to be congratulated on a successful snapshot, as Justen had an objection to being photographed.

FREDERICK JUSTEN

NEW AND RARE BRITISH HEPATICÆ.

By Symers M. Macvicar.

Riccia Huebeneriana Lindeb. var. pseudo-Frostii Schiffn. in *Osterr. bot. Zeit.* lv. 8 (1905). Mr. W. E. Nicholson recently sent me a *Riccia* gathered by him at Horsted Keynes, Sussex, 22nd September, 1906, the habitat being on the mud of a large pond. The violet colour of some of the fronds had suggested to him that the plant was rather *R. Huebeneriana* than *R. crystallina*, to which he had previously referred it. On examination I found the plant to be nearer *R. Huebeneriana* than any other species known to me, but, as it differed somewhat from my continental specimens in being less dichotomously branched, fronds rather larger and more frequently green, I sent part of the specimen to M. Crozals. This specialist in the genus confirmed the plant as *R. Huebeneriana*. Mr. Nicholson afterwards sent a specimen to Prof. Schiffner, who replied that it was *R. Hübeneriana* var. *pseudo-Frostii*. In the *Fragmente* Schiffner mentions that there are two chief forms of *R. Huebeneriana* :—1. The typical plant, as described and figured by Lindenberg in *Monogr. Ricc.* This form has regularly dichotomous branches with spreading segments. 2. The form to which he gives the name var. *pseudo-Frostii*. The latter has a quite different habit, forming close rosettes with parallel segments lying near one another, and being about twice as large ; also being yellow-green, with the borders sometimes rather reddish in colour. Schiffner states that in the meantime he cannot decide with certainty whether this var. *pseudo-Frostii* ought to be considered as a species or not, as he had not fresh material of typical *R. Huebeneriana* for comparison. It appears from the note to Mr. Nicholson that he has now come to the conclusion that it is worthy of specific rank, but it has not been so published.

The only other European species having large air-cavities which the plant under consideration can be confused with is *R. crystallina*. The latter is green or yellow-green in all its stages, never becoming tinged with violet; fronds flat, larger and broader, obcuneate, in section of nearly the same diameter throughout, the dorsal and ventral surfaces being almost parallel; spores 70–82 μ. The former has the fronds more or less violet except in shade, narrower, and channelled towards the ends of the segments ; in section is nearly quadrate, and shows a distinct furrow ; spores 56–73 μ. In this species also the capsule ruptures through the ventral surface of the frond.

Mr. Nicholson first gathered this interesting addition to our flora in Crowborough, in Sussex, September, 1904, where he found it again this year, as well as in the locality at Horsted Keynes.

Lophozia badensis (Gottsche) Schiffn. *Jungermannia badensis* Gottsche in Gott. et Rabh. Hep. eur. exs. no. 95 (1859). This species has been much confused with *Lophozia turbinata* (Raddi) Steph., and to a less extent with small forms of *Lophozia Muelleri*. Schiffner has recently gone fully into the question of the confusion

which has arisen over this group in his *Beitr. z. Aufkl. c. polymorph. Artengr. d. Leb.*, published in *Verhandl. der K.K. Zool.-bot. Ges. in Wien*, p. 381, 1904. In this paper he shows that the *Lophozia turbinata* of Central European authors is, in fact, *L. badensis*. As regards British plants, Mr. Pearson, in *Hep. Brit. Isles*, p. 309, gives *L. badensis*, with the citation of the original species, as a synonym of *L. turbinata* (Raddi). In my herbarium I find that the following specimens named *L. turbinata* are *L. badensis*:—Yorkshire: Knottingley, Oct. 14th, 1898, *W. Ingham*. Ayrshire: Mochra Hill, Jan. 17th, 1883, *P. Ewing*. Edinburgh: on River Almond above the old mill, Cramond, Sept. 12th, 1904, *J. McAndrew*. Fife: sandstone wall near Falkland, Nov. 21st, 1903, *W. Evans*. East Rossshire: Fairy Glen, Rosemarkie, October, 1903, *Miss K. B. Macrae*.

Comparative descriptions of the two species are given in Lindb. & Arnell's *Musc. Asiæ bor.* p. 46. I find the following points the most useful in distinguishing between them:—In *L. turbinata* the leaves, except generally in the male plant, have a narrow base, even in the broad-leaved forms. This is very marked in the sterile stems, where the leaves become obovate or nearly elliptical. They are also not decurrent at the antical base. The leaf-cells are larger, without thickenings at the angles. The stems are usually concolorous, with comparatively few rhizoids, and the leaves are generally more remote, and lie flat. In *L. badensis* the leaves have a broad base, even on the smallest sterile stems, the leaves being there quadrate. The antical base is decurrent, and the cells smaller and slightly thickened at the angles. The stem has copious rhizoids, which are fuscous coloured, as is the postical side of the stem.

L. turbinata is a western and Mediterranean species, while *L. badensis* is widely spread throughout Europe.

Lophozia badensis differs from small forms of *L. Muelleri* chiefly in the larger leaf-cells, which are only slightly thickened at the angles, and by the absence of under leaves, although a small nearly obsolete under leaf may rarely occur. The stems also are usually more translucent, and the male bracts differ to some extent. Under the name *Jungermannia acuta* Lindenb. both *L. turbinata* and *L. badensis*, as well as *L. Muelleri*, have been included by many authors. As to British plants, Mr. Pearson gives *J. bantriensis* var. *acuta* (Lindenb.), which he distinguishes from the var. *Muelleri*. Schiffner, in the paper above referred to (p. 390), footnote, in referring to Mr. Pearson's plant, says:—"The plant described on p. 316 as *Jg. bantriensis* var. *acuta*, and figured on plate 135, is quite certainly (compare the cell structure) only a rather small form of *Lophozia Müllerі* (not *L. badensis*!)." The figure of the cell structure, drawn from a plant of Carrington's, gathered at Dunkeld, as well as the description of the cell structure in the letterpress, no doubt excludes *L. badensis*, but some of the figures in the plate have been drawn from Gott. & Rabh. Hep. eur. exs. no. 643, which Schiffner allows to be *L. badensis*, while others have been drawn from Spruce's Castle Howard plant, which is without doubt *L. badensis*. Mr. M. B. Slater kindly gave me a specimen of this gathering of Spruce's, the locality being "New River Bridge, Castle Howard."

I find this plant to be *L. badensis*. Spruce had named it *J. turbinata*, then corrected it to *J. acuta*. As showing the difficulty of this group, I find that a plant, also given to me by Mr. Slater, from the Pyrenees, named *J. acuta* by Spruce, is a small form of *J. Muelleri*. It has numerous well-developed under leaves, and thickened angles to the leaf-cells. The other localities which Mr. Pearson gives for the var. *acuta* are—near Buxton, Derbyshire, *J. Whitehead*; and Ashwood Dale, near Buxton, *G. A. Holt*. I have not seen these specimens. Prof. Barker kindly sent me the only packet of *J. acuta* in Whitehead's herbarium; it is from Sands, Southport, May, 1868, *G. E. Hunt*. There are only a few stems, insufficient to be certain of, but they seem rather more like *L. badensis* than *L. Muelleri*. Canon Lett, in *Brit. Hep.*, follows Mr. Pearson. He does not give any new localities. In my *Census of Scottish Hepaticæ* (*Ann. Scot. Nat. Hist.* p. 48, 1904) I have given *L. Muelleri* var. *acuta* for Elginshire. More recent examination shows this plant to be *L. Muelleri* var. *pumila* Nees.

It had been known for some time that *J. acuta* of Lindenberg was a mixed species. Lindberg, in *Musc. Asiæ bor.* p. 46, mentioned that the name could not stand, and Schiffner has gone exhaustively into the subject in his paper, which the student must consult. It is there clearly shown that no definite plant can be assigned to that name.

I omitted to give the reference of *Jungermannia bantriensis* var. *acuta* (Lindenb.), which Lindberg has in *Hepat. in Hib. lectæ*, 1875, p. 528. The locality where he found the plant is Connor Hill, co. Kerry. I have not seen a specimen.

Prionolobus striatulus (C. Jens.) Schiffn. *Cephalozia striatula* C. Jensen in Revue Bryol. p. 25 (1904). I found this addition to our flora on Lousie Wood Law, Elvanfoot, Lanarkshire, alt. 1900 ft., June 6th, 1906. This hill belongs to the Lowther range of the Southern Uplands, and like most of them has a broad round summit. It is one of those having a layer of peat over the upper part, on which is found the *Vaccinium Myrtillus*, *Empetrum*, and *Polytrichum* association, and it is in this association that the *Prionolobus* occurs, creeping over the decaying parts of very compact tufts of *Sphagnum*. The Elvanfoot plant had abundance of perianths. It agrees with specimens given me by Herr Persson from the original localities in Sweden, and with the description and figures in *Revue Bryologique*. It cannot very well be confused with any other of our species except *Cephaloziella elachista*, but the latter is readily distinguished by its larger thin-walled leaf-cells.

The *Prionolobus* has been found in Sweden, Denmark, and France. Prof. Douin, who has found it in the latter country, states, in his recently published *Muscinées d'Eure-et-Loir*, p. 257, that this is the species from the Swiss Jura which Boulay has given in *Musc. de la France*, ii. *Hépatiques*, p. 69, as *Cephalozia elachista*, and that the latter, as far as he knows, has not yet been found in France. *C. elachista* has lately been found in Sussex by Mr. Nicholson. It had previously been recorded as a Britannic plant only from Ireland.

CEPHALOZIELLA INTEGERRIMA (Lindb.) Warnst. *Cephalozia integerrima* Lindb. in Meddel. Soc. pro Fauna et Fl. fenn. 1876. Mr. Nicholson sent me from Sussex two specimens of an hepatic, mentioning at the same time that they rather reminded him of a specimen of *C. Bryhnii* received from M. Douin. The labels were: "Damp sandy hedge-bank, Slugwash Lane, Wivelsfield, September, 1906," and "Damp sandy ground under heather, St. John's Common, Crowborough, 7th October, 1906," both plants having been gathered by himself. The specimen from the latter locality was in the best condition, though mixed with *C. byssacea* (Roth.) Warnst. On examining these plants I found that without doubt they belonged to an unrecorded British species, and that they were either *C. Bryhnii* Kaal. or *C. integerrima* Lindb. On comparing a specimen of the former from Smestad, near Christiania, Sept. 27th, 1895, leg. Kaalaas with specimens of the latter from near Södertelge, Södermanland, June 20th, 1903, and Sept. 10th, 1903, both leg. J. Persson, it struck me that all these plants belonged to one species, and further examination confirmed this opinion. Mr. Nicholson has since told me that a suspicion of the identity of these two species had crossed his mind independently, and that had it not been that the name *Bryhnii* was uppermost in his mind from his recent correspondence with M. Douin, he would probably have suggested that the plants which he was sending me were *integerrima*.

Herr Kaalaas, in describing *C. Bryhnii* in *De Dist. Hep. in Norveg.* p. 153, 1893, gives the differences between it and *C. integerrima* in the former having acute leaf-lobes, and in the structure of the perichætium. As to the leaf-lobes, I cannot find that there is any constant difference. *C. Bryhnii* has frequently rather obtuse lobes, and *C. integerrima* has them often rather acute. The leaf-cells do not show any difference. With regard to the more important mark—the structure of the innermost involucral bracts—although Herr Kaalaas' plant has sometimes more acutely lobed bracts than any I have found in *C. integerrima*, there are on the other hand many of the bracts which are indistinguishable from those of the latter plant.

M. Douin, in his *Muscinées d'Eure-et-Loir*, p. 262, 1906, describes and figures a *Cephaloziella* under the name *C. piriflora*, nov. sp. In a note he mentions the points in which it differs from *C. Bryhnii*, but the specimen given to him as the latter species was probably a mixture, as the acute and strongly dentate lobes of the involucral bracts which he gives is not applicable to *C. Bryhnii*. In the *Addenda*, p. 354, he quotes a remark from Prof. Schiffner: "Your *Ceph. piriflora* is quite certainly identical with *C. Bryhnii* Kaal.!" M. Douin kindly sent me a specimen from Montigny-le-Chartif, Eure-et-Loir, April 16th, 1906. The lobes of the involucral bracts are very obtuse in this plant; the leaves are also rather obtuse. In fact, it more resembles my specimens of *C. integerrima* than that of *C. Bryhnii*.

The highly connate, very obtuse bracts and bracteole of *C. integerrima* will at once distinguish it from any other of our described species. Mr. Nicholson is to be congratulated on the discovery of such a distinct addition to our flora.

MR. J. G. BAKER.

The *Naturalist* is publishing an interesting series of biographical sketches entitled "Prominent Yorkshire Workers." The subject of the January biography is Mr. John Gilbert Baker, of whom Mr. T. Sheppard gives a sympathetic account, accompanied by an excellent portrait which the kindness of the editors and publishers of the *Naturalist* allows us to reproduce. Our readers may like to contrast it with that reproduced in this Journal for 1893, p. 244, from the portrait by Mr. J. W. Forster.

John Gilbert Baker
Aug. 4 1906

BIBLIOGRAPHICAL NOTES.

XLI.—The "Illustrations of Australian Plants."

My attention has been called to a notice by Mr. J. H. Maiden (Journ. Proc. Roy. Soc. N. S. Wales, xxxix. 34–39) of the *Illustrations of Australian Plants* which perhaps calls for some comment. Mr. Maiden speaks appreciatively of the importance of the work and kindly of my share in its publication, and not unreasonably takes exception to certain proposed changes of nomenclature, some of which would not have been suggested had the decisions of the Vienna Congress been arrived at at the time the *Illustrations* was issued.

I think, however, that some of Mr. Maiden's remarks show a somewhat imperfect appreciation of the facts of the case. For example, he says :—

"That the copper plates of the present work should have remained in the British Museum unpublished for nearly 130 years is a remarkable occurrence, and shows how leisurely the progress of British science can be. While grateful for its belated appearance it seems difficult to believe that this most regrettable delay has been unavoidable."

Mr. Maiden does not seem to have realized that, as I have explained in the introduction to the work (reproduced in this Journal for 1905, pp. 284–290) the preparation of the plates was a private undertaking on the part of Banks, who spent upon them large sums of money. "British science" officially was in no way responsible for the delay during Banks's life-time, and when the plates became the property of the British Museum, no condition as to publication was attached to their acquisition. The plates only came into the possession of the British Museum in 1820, so that the period named by Mr. Maiden must be reduced by at least fifty years. Mr. Carruthers, during his keepership of the Department of Botany, more than once urged upon the Trustees the desirability of publishing the plates, but financial considerations prevented the undertaking until 1900. And, although I am probably the last person to depreciate the value of a work in which I have taken the greatest interest, it seems to me that on many grounds it may be doubted whether the actual scientific value of the book, apart from its historical interest, is equivalent to the expense necessary to its production; and this reason has so far weighed with the Trustees that the remainder of the plates of the plants of Cook's Voyage will not be proceeded with.

Mr. Maiden ends his notice with the following paragraph :—

"In conclusion, the publication of these fine folio volumes simply whets the appetites of Australians for more. We yearn for the publication of Solander's and Brown's manuscripts, and trust that they will not be kept back from any considerations of nomenclature of species. Such a reason, if advanced, seems to us inadequate in the case of priceless historical documents of the deepest

interest to Australians. We would have liked our fathers to have had the privilege of seeing them; shall the privilege be denied to the living and only be bestowed on a generation yet to be born? With all respect to the eminent specialists forming the scientific staff of the British Museum, we feel sure that these manuscripts must contain observations which can only be fully interpreted and appreciated by Australians."

It would seem that our Australian friends have an exaggerated estimate of the MSS. in the possession of the Museum, both as to their value and extent; the note as to Solander's supposed Journal (see Journ. Bot. 1906, p. 71) illustrates what I mean. So far as Solander's MSS. are concerned, they consist solely of descriptions of plants in terms as shown by those already published—the greater number—largely obsolete, and it is difficult to see who would benefit by their publication. It is a straining of language to call these technical descriptions "priceless historical documents," and I am at a loss to understand what Mr. Maiden means by the suggestion that "any considerations of nomenclature of species" could be "advanced" as a reason for "keeping them back." With regard to Robert Brown's MSS. again, it seems doubtful whether at the present time there would be adequate gain in publishing descriptions a hundred years old of plants most if not all of which must be familiar to botanists. It would certainly be undesirable to print the large number of unpublished names which occur in both Solander's and Brown's MSS., and I am sorry to see that Mr. Maiden defends the practice.* When distributing Brown's herbarium we were most careful not to send out any unpublished names, and the same plan was adopted with the set of Banks and Solander plants sent to Sydney.

I am the more surprised that Mr. Maiden should refer again to the supposed "keeping back" of the Brown MSS., because in this Journal for 1903 (p. 252) I dealt with the similar complaint contained in his *Revision of Eucalyptus* (part i. p. 20) where he assumes the "suppression of these descriptions," and expresses a doubt "whether this suppression eventually met with the acquiescence of Robert Brown himself, or whether he was controlled in this respect by superior authority." I am unable even to guess at what Mr. Maiden intends to suggest by his references to "suppression" and to Brown's being "controlled by superior authority"; but there is, as I said before, absolutely no ground for supposing that anyone but Brown himself was responsible for the non-publication of his MSS.

The value and bearing of the Solander and Brown MSS. can only be fully appreciated if they are correlated with the specimens to which they refer, and this can only be done at the National Herbarium. Would it not be possible for some competent Australian botanist to come over and see for himself what material exists, and how it can best be employed? It must, I think, rest with the Colony to decide whether "the privilege [shall] be denied to the living and only bestowed on a generation yet to be born."

* Proc. Linn. Soc. N. S. Wales, xxvii. 700.

It is certain, too, that more might be done by correspondence than is done at present, and we at the National Herbarium are, as I think Mr. Maiden knows, always ready and willing to do our best to help him and his fellow-workers. For example, Mr. Maiden in his Flora of Norfolk Island (Proc. Linn. Soc. N. S. W. xxviii. 692–785) gives an account of Ferdinand Bauer (p. 778) entirely derived from the account by Lhotsky in Lond. Journ. Bot. ii. 106–113 (1843). Mr. Maiden makes no reference to the large collection of his drawings of Australian plants presented by the Admiralty to the British Museum in that year, and says that he does not know what became of Francis Bauer's collections. Yet a reference to so easily accessible a work as the *Biographical Index of British Botanists* would have shown him that drawings of both workers are in the Department of Botany, and a letter would at once have secured further information about these. Under *Streblorrhiza* (l. c. 703) Mr. Maiden says that Bauer's drawing is "at the British Museum or Vienna"—it is not at the Museum—showing that he knew of the Museum collection, although he does not mention it when speaking of the artist; nor does he say, although this, too, he might readily have ascertained, that the drawings of plants and animals purchased by Robert Brown now form part of the British Museum collections. A list of Ferdinand Bauer's Australian drawings at the Museum will be published shortly in this Journal.

But, although the Brown and Solander descriptions can scarcely be regarded as "historical documents of the deepest interest to Australians," there are other manuscripts in the Department of Botany which fairly deserve to be so considered. Thus we have accounts by George Caley of various journeys undertaken by him in 1801–6, with descriptions of plants of "the Colony" (New South Wales) and letters to Banks. We have also the Journal of Allan Cunningham for 1817–1821, with lists of plants obtained, and notes on plants collected on the banks of Brisbane River in the winter and spring of 1829 and in Norfolk Island in the winter of 1830; this Journal was extensively used by Robert Heward in his biography of Cunningham in Hooker's *Journal of Botany* iv. 231–320 and *London Journal of Botany* i. 107–128, 263–292: with the same Journal is a copy of the list of plants collected by Charles Fraser for Earl Bathurst in 1817. The reference to the volumes of drawings by Thomas Watling (Journ. Bot. 1902, 302) has doubtless been noted by Australian naturalists. A volume of MS. reports on Norfolk Island for 1840–43, given to Robert Brown by Captain Alexander Maconochie, Lieutenant-Governor of the island, is also in the Department of Botany.

It may perhaps be possible for Mr. Maiden to arrange with his Government for a transcription of these MSS. or some of them. I am quite at one with him in thinking that the observations they contain "can only be fully interpreted and appreciated by Australians"; and I am sure that the British Museum authorities will give every facility for their consultation or transcription.

JAMES BRITTEN.

SHORT NOTES.

Erythræa capitata Willd. on the mainland of Hants.—Ever since the discovery of this interesting Centaury in the Isle of Wight by the late Mr. Frederick Townsend, I have been annually searching for it in the more southerly parts of the contiguous Hampshire mainland, with no success till last July, when I found, in a locality so restricted that it is more prudent, at present at all events, not to expatiate upon it in detail, a dozen or more fine plants. Though recognizable almost at a glance by the stamens proceeding from the base of the corolla-tube, I thought it well to call in the expert opinion of the Rev. Edward F. Linton, who confirms my views, and informs me that it has been found to occur, as an extreme rarity, in Dorset. It has previously been recorded from Cornwall in the west to Sussex in the east, and will probably now be discovered in intermediate spots, but the greatest care must be exercised, as *E. Centaurium* L. seems protean in form, and a dwarf, broad-leaved state of this species is common along the coast and very deceptive. I am hoping, this ensuing summer, to make more extended observations, and expect to be able to record *E. capitata* Willd. eventually as quite plentiful, if local, in this new habitat.—J. Cosmo Melvill.

Caermarthenshire Plants.—James Motley's herbarium, at the Royal Institution of South Wales (Swansea), contains a great many plants from v.-c. 44, many of which confirm and illustrate his Caermarthenshire list which Watson used for Top. Bot. The following, however, are additional to the list, and must go down as new county records for v.-c. 44, viz., *Hypericum humifusum* L., *Trifolium glomeratum* L., *Myrrhis odorata* Scop., *Galium anglicum* L. (Watson clearly had not seen the specimen), *Gnaphalium sylvaticum* L., *Lamium amplexicaule* L., *Atriplex angustifolia* Sm., *Lemna trisulca* L., *Carex vulgaris* × *acuta* (teste E. F. Linton), *Avena fatua* L. (confirmed, but doubtfully native), *Bromus commutatus* Schrad. Other plants of interest are the glandular form of *Sagina nodosa* Fenzl., *Spiræa Ulmaria* var. *denudata* Boenn., *Rubus fissus* Lindl., *R. plicatus* Weihe & Nees, *Œnothera biennis* L. ("Pembrey Burrows, extremely abundant and more scabrous than usual"—a remark which holds good after sixty years), *Artemisia vulgaris* L. var. *coarctata* Forcell. (the commoner form, apparently, in S. Wales), *Senecio aquaticus* Huds. (discoid form), *Mentha gentilis* L. (not separated in Top. Bot.), *Polygonum aviculare* L. var. *arenastrum* Bor., *Salix repens* L., apparently var. *ascendens* Sm. (*fide* E. F. Linton), *Phleum pratense* var. *nodosum* L., *Agrostis palustris* var. *maritima* Mey., *Lastrea spinulosa* Presl, *Polypodium vulgare* L. var. *proliferum*, *Chara aspera* Willd.—H. J. Riddelsdell.

Cystopteris fragilis in Suffolk (p. 33).—Moore gives D. Stock as the authority for this plant at Bungay. In a parcel now in my possession, which formerly belonged to the late Ellen Wright, of Buxton, Norfolk, is a specimen of *C. fragilis* labelled:—"On the garden wall of Lord Manners, Yoxford Grove, Suffolk; found by a botanist, Sept., 1840."—Alice M. Geldart.

Orobanche purpurea Jacq. in Pembrokeshire.—In July last Mr. J. E. Arnett, of Tenby, kindly sent me a specimen of this plant, which he had gathered near the town the day before. It is, I believe, an addition to the flora of the county.—Richard F. Towndrow.

Berks and Hants Rubi.—I devoted a good deal of attention last summer to the bramble-flora of the gravel-capped commons surrounding Newbury, where *Rubus* is strongly represented by an interesting series of forms. At Greenham this is especially the case, but here frequent furze-fires have a disfiguring effect on the landscape, and must check considerably the luxuriance of the bushes. The following notes are the results of my investigations, and are mostly additional to the records in Mr. Druce's account of Berks Rubi in his flora of the county. An asterisk denotes a new county record :— *Rubus nitidus* Wh. & N. Greenham Common.— *R. carpinifolius* Wh. & N. Chapel Row, Bucklebury. — *R. rhombifolius* Weihe. Greenham Common ; one large bush near the vicarage. — **R. hirtifolius* Muell. & Wirtg. var. *mollissimus* Rogers. Greenham Common, in two spots. — *R. radula* Weihe var. *echinatoides*. Abundant on Greenham Common, especially near Berry's Bank.—*R. echinatus* Lindl. Near Donnington Castle.—*R. Lejeunei* Weihe & Nees var. *ericetorum* Lefev. Thicket in Hamstead Park. —*R. pallidus* Wh. & N. Snelsmore and Greenham Commons.— *R. foliosus* Wh. & N. Crookham Common.—*R. rosaceus* Wh. & N. var. *infecundus* Rogers. Lane near Hamstead, *Marshall*.—*R. Kochleri*. A distinct-looking bramble—which Mr. Rogers says is very like the Staffordshire plant referred to in *Handbook Brit. Rubi*, p. 184, as *R. distractus*—grows in a lane at Wash Common.—*R. Marshalli* Focke & Rogers. Crookham Common.—*Var. *semiglaber* Rogers. Greenham Common, but with the leaves untypical.—The following are additional Hants records :— **R. Rogersii* Linton. Damp copse near Newtoun, North Hants ; new to Hants mainland. —*R. mucronatus* Blox. var. *nudicaulis* Rogers. Otterburne Common. —*R. rudis* Wh. & N. Near Sydmonton, North Hants.—My thanks are due to Mr. Rogers, who, as usual, has assisted me with difficult plants.—A. Bruce Jackson.

Cardigan Plants.—The following plants, not recorded for this county, were met with during a visit to Aberystwyth, from June 7th to 23rd, 1906 :—*Ranunculus Ficaria*, *Brassica rapa* var. *Briggsii*, *Trigonella purpurascens*, *Pyrus Aria*, *P. Malus*, *Sedum acre*, *Epilobium obscurum*, *Galium Mollugo*, *Tanacetum vulgare*, *Carduus nutans*, *Crepis taraxacifolia*, *Leontodon hirtus*, *Tragopogon pratense* var. *minus*, *Myosotis versicolor*, *Thymus Chamædrys* (aggregate only in *Top. Bot.*), *Polygonum amphibium* var. *terrestre*, *Hippophaë rhamnoides* (probably planted), *Populus tremula*, *Orchis maculata*, *Luzula campestris*, *Trisetum pratense*, *Festuca rigida*, *F. uniglumis*, *F. sciuroides*. The following varieties of species already recorded were observed :— *Lathyrus montanus* var. *tenuifolius*, *Aira caryophyllea* var. *aggregata*, *Bromus mollis* var. *glabratus*, *Lastrea Filix-mas* var. *paleacea*. *Potentilla reptans* × *silvestris* was gathered, and *Trifolium hybridum* and *Petasites fragrans* were noted.—Richard F. Towndrow.

NOTICES OF BOOKS.

Biologische und Morphologische Untersuchungen über Wasser- und Sumpfgewächse, II. Von Prof. Dr. Hugo Glück in Heidelberg. 8vo, pp. xvii, 256, 28 figs. in text, and 6 plates. Jena: Fischer. 1906. Price 18 marks.

Dr. Glück's second contribution to our knowledge of the biology and morphology of water- and marsh-plants comprises the results of his study of the Central European species of *Utricularia*, of winter buds in a number of genera of water-plants and of points in the biology of *Ceratophyllum*. His study of *Utricularia* confirms the view taken by Goebel—to whom the author dedicates his book—as to the morphology of the vegetative organs. That is to say, shoot and leaf are here not contrasting morphological ideas; no limit can be set between them—shoot, leaf, and pitcher arise one from the other, or may be changed one to the other. Comparative systematic study, history of development and abnormal formation, all confirm this view.

In the course of his work Dr. Glück has made a detailed study of one and the same species from different localities, with special attention to differences in situation, such as deep and shallow water or land; and gives in a tabular form the relative length of shoot, relative size of leaf and other details in the forms from the various localities. The water-shoots are best developed in the deep-water forms, while those from shallow water are intermediate between the deep-water and the land form. A systematic arrangement is given of the six Central European species, based on presence or absence of rhizoids on the base of the inflorescence, and presence or absence of aerial shoots; and diagnoses of the vegetative organs are included for each species.

The author has also made a detailed examination of the structure, germination and functions of the buds which serve as resting- or winter-buds, and for means of vegetative propagation in a large series of water-plants, including *Elodea*, *Stratiotes*, *Hydrilla*, *Myriophyllum*, *Utricularia*, *Potamogeton*, and *Hydrocharis*. These are grouped according to the morphological character of the scales by which the bud is protected, which represent the whole leaf-blade of a foliage-leaf as in the first five genera mentioned, or the leaf-base only as in *Aldrovanda* and *Caldesia*, or an axillary stipule as in *Potamogeton*, or a pair of stipules as in *Hydrocharis*. Finally, a point of interest is described in the biology of *Ceratophyllum*. Contrary to the general view that this is a free-swimming plant, the author finds that it is in the first instance anchored to the substratum by peculiar rhizoids, which also take up nourishment. These rhizoids are metamorphosed shoots. The value of the work is enhanced by the excellent drawings, both in the text and in the large double plates at the end of the volume.

A. B. R.

Manual of the New Zealand Flora. By T. F. Cheeseman, F.L.S., F.Z.S., Curator of the Auckland Museum. Published under the Authority of the Government of New Zealand. Wellington: Mackay. 8vo, cl., pp. xxxvi, 1199.

In this well-printed volume of more than two thousand pages Mr. Cheeseman has given a complete compendium and account of the flora of New Zealand, so far as phanerogams, ferns, and fern-allies are concerned. It is, as he reminds us, forty-two years since Sir Joseph Hooker published the first part of his *Handbook*, and since then considerably over a thousand species have been added to the flora. It was hoped that Mr. Thomas Kirk, who had for many years been preparing a hand-book, would have carried his work to completion, but at his death barely two-fifths of this were ready for the press; and his *Students' Flora of New Zealand*, issued by the Government towards the end of 1897 and noticed in this Journal for 1898, included only the Polypetalæ and part of the Monopetalæ.

It was fortunate for the Colony that it had at its disposal, in the person of Mr. T. F. Cheeseman, a botanist competent to take Kirk's place and to carry out the work which he had undertaken. Mr. Cheeseman's researches into the flora began in 1870, and have been carried on continuously up to the present time; and his published papers have given ample evidence of his capability for the task he has now completed. He has wisely confined it to indigenous plants, thus departing from the plan of Kirk, who included descriptions of the very numerous more or less naturalized introductions, of which a list is here given in the Appendix. The descriptions, which are evidently drawn up from personal observation, strike us as extremely good—of sufficient length to be of service to the intelligent observer, couched in well-chosen terms, and accompanied by a full and careful synonymy so far as it concerns the literature of New Zealand botany. I am glad to see that the practice of Kirk in printing the until then unpublished names in the transcript of Solander's MS. Flora supplied by the Trustees of the British Museum has not been followed; it is to be regretted that they should have so far got into print. A considerable number of the Banks and Solander names had however been cited by Sir Joseph Hooker in his *Flora of New Zealand*, with references to the Banksian figures and MSS.; these are entirely omitted from the *Index Kewensis*, which is the more remarkable in that they appear not only in the body of the Flora, but also in the index thereto.

The notes upon various critical species show a wide acquaintance with plants, as well as with botanical literature; and a number of new species are described. I note that *Trophis opaca* of Banks and Solander, a plant referred to *Paratrophis heterophylla* as a variety by Kirk in this Journal for 1897 (p. 222), is raised to the rank of a species under the name *P. Banksii*; the oldest specific name should however have been preserved. It is of course only in the field that the real value of a book of this kind can be properly estimated, but there is reason to believe Mr. Cheeseman's *Manual* will stand this test. Since the book came to hand, I have been engaged in writing up the collections of Banks and Solander in

connection with their MSS. and the drawings made by Sidney Parkinson during their voyage, elaborated by F. P. Nodder, and in part engraved. In the course of this I have had occasion to use Mr. Cheeseman's book, and am struck with its scholarly character —a character too often conspicuously wanting in recent colonial work. So far as I can judge, botany has gained rather than lost by the undertaking having come into Mr. Cheeseman's hands. I hope to publish later some notes resulting from an examination of the Banksian material, with a complete enumeration of the drawings.

The *Manual* is prefaced by a very interesting and well-executed history of botanical discovery in New Zealand, in which brief accounts are given of the various investigations from the time of Cook's first visit to the present. In connection with the collections made by Banks and Solander during Cook's visit, it may perhaps be well to say here that it has been decided by the Trustees of the British Museum not to proceed with the publication of the plates and MSS. connected with these. In the Appendix, besides the list of introduced plants already mentioned, are a synoptical key to the orders; a long list of Maori plant-names compiled from various sources; a useful glossary; and a number of additions and corrections.

JAMES BRITTEN.

BOOK-NOTES, NEWS, &c.

AT the meeting of the Linnean Society on Dec. 6th, 1906, a paper by Prof. A. J. Ewart, F.L.S., on "The Physiology of the Museum Beetle, *Anthrenus museorum* (Linn.) Fabr." was read. The mischief wrought by this species in the National Herbarium at Melbourne is great, and is only kept in check by systematic use of a chamber impregnated by the vapour of carbon-bisulphide, in which the plants are placed for several days at a time. The use of corrosive sublimate is not advisable owing to the grave danger to health in a dust-forming atmosphere. The most remarkable feature of the larvæ is their power of feeding on dry material, with less than 9 per cent. of water; and yet these larvæ exhibit the usual amount in their structure, averaging 70 per cent. The author suggests that the water may be chemically derived from decomposition of the carbo-hydrate food they consume. Bacteria are present in abundance in the alimentary canals of these grubs, and oxidize the carbon of the food where no transpiration of water is possible.

AT the meeting of the same Society on Dec. 20th, Mr. N. E. Brown exhibited a photograph and dried specimens of *Fockea capensis* Endl., a plant of considerable interest on account of its great rarity and its apparently great longevity. It was originally described and figured by N. J. Jacquin, a hundred years ago, in his *Fragmenta Botanica*, p. 31, t. 34, f. 5, as *Cynanchum crispum*, from a plant which had been introduced from South Africa, and cultivated in the Imperial Garden at Schönbrunn. In 1838 Endlicher,

in his *Iconographia Generum Plantarum*, refigured the plant, and generically separated it from *Cynanchum* on account of its remarkable structure. This self-same individual (from which both the above-mentioned figures were made) has been in cultivation at Schönbrunn from Jacquin's time until now, and is the only example of the species known, since Dr. A. Zahlbruckner states that all attempts to propagate it have failed, and no collector appears to have refound it, the only dried specimen in existence, so far as known, being the one exhibited. The living plant was exhibited at the Botanical Congress held at Vienna in 1905, and in the Report of that Congress, p. 77, is a note concerning it, where it is stated that the age of the plant is probably about one hundred and fifty years. But when Jacquin described the plant one hundred years ago he stated that the tuber was about 1 ft. long and 6 in. thick; at the present time, from calculations I have made from the photograph of the plant by comparing the length of the largest leaves on the dried specimen with those of the photograph, I find that the tuber is about $7\frac{1}{3}$ in. thick, and stands about $12\frac{1}{4}$ in. above the ground. As this small increase in size during one hundred years has been obtained under the conditions of cultivation, where the plant would obtain more moisture, and be likely to grow more rapidly than in the very dry climate of its natural habitat, it would appear conclusive that its growth is extremely slow, and that the actual age of the individual in question is probably much more than one hundred and fifty years. Burchell, in a note with a dried specimen of the very closely allied *F. glabra* Decne., states that the tuber is sometimes as much as 2 ft. in diameter, and, if as slow-growing as *F. capensis*, this would imply that the plant must attain an age of several centuries. None of the species of *Fockea* appears to be common, and, as the tubers are eaten by the natives, and do not appear to produce fruit freely, it is possible that they may be approaching extinction. Two other interesting plants—*Babiana spathacea* Ker, and *Eriosphæra Oculus-cati* Less.—were exhibited further to illustrate how very rare or very local some of the South African plants are, since neither of these two has been collected by any botanical traveller since Thunberg found them in 1774, until these specimens were gathered. The *Babiana* was originally described as *Gladiolus spathaceus* Linn. f. Suppl. p. 96, from a specimen collected by Thunberg. The *Eriosphæra* was originally described as *Gnaphalium Oculus-Cati* Linn. f. Suppl. 364, from a specimen collected by Sparrman; a specimen of it in Thunberg's herbarium, upon which Lessing founded the genus *Eriosphæra*, is figured by Harvey in his *Thesaurus Capensis*, vol. ii. p. 30, t. 149.

At the same meeting Dr. A. B. Rendle presented a report on the botanical collections made by Dr. W. A. Cunnington in Lakes Nyasa, Tanganyika, and the Victoria Nyanza, 1904–5. Dr. Cunnington spent about three weeks on and about Lake Nyasa, nearly nine months at Lake Tanganyika, and less than a fortnight on the West of the Victoria Nyanza. His object was to make as complete a collection as possible of the plants and animals, especially from

Lake Tanganyika, with a view to solving the "Tanganyika problem"—whether the fauna and flora of this lake indicate a former marine connection. As illustrated by a good series of specimens laid on the table, the flowering plants, fern allies, and *Characeæ*, numbering about forty-five species, were for the most part well-known and widely-distributed forms, such as *Najas marina*, species of *Potamogeton*, *Pistia Stratiotes*, *Ceratophyllum demersum*, *Myriophyllum spicatum*, *Jussiæa repens*, *Trapa natans*, and *Chara zeylanica*, with others restricted to Tropical or Subtropical Africa, such as *Ottelia*, *Boottia scabra*, and species of *Utricularia*. In no case was there any suggestion of marine conditions, either past or present, in the representatives of the flora. The plankton and fresh-water algæ, of which an account was given by Mr. G. S. West, yielded remarkably rich results; due partly, no doubt, to the paucity of our previous knowledge of the microscopic flora of these lakes, especially in the case of Tanganyika. Mr. West's list contains about 400 species, a large proportion of which are new, including one new genus of *Palmellaceæ*. A few species from Tanganyika showed a striking affinity with marine forms, indicating that at some period the water of this lake had a considerable degree of salinity. But, as Dr. Cunnington explained, this did not involve a previous marine connection, but might be explained by an increase in saline matter in the water due to the damming of the outlet from the lake. This damming was perhaps a periodical occurrence, since Stanley, thirty years ago, described the lake as with no outlet; while a few years later Mr. Hore, visiting the same spot as Stanley, found the water rushing through the present outlet towards the Congo.

At the meeting of the Linnean Society on Jan. 17, Mr. William Henry Pearson was elected an Associate of the Society. This was the first election under the new bye-laws, which, as is often the case, prove to have been so drawn up as to present difficulties in working which had to be overcome. There were five candidates for election, two of whom were specially recommended by the Council. This proceeding seems to us objectionable on several grounds; it did not, however, affect the result, as the Fellows exercised their right and elected a candidate not officially recommended. Mr. Pearson has for many years been a contributor to these pages, and we congratulate him on his election.

Attention should have been called earlier to the sketch of "Crabbe as a Botanist," read by Mr. James Groves at the Crabbe Commemoration at Aldeburgh in 1905, and published in the Proceedings of the Suffolk Institute of Archæology and Natural History, vol. xii. part 2. Mr. Groves publishes interesting letters from the poet regarding *Trifolium suffocatum*, of which he was, though not the first discoverer, one of the earliest observers in Britain, and of which his drawing and specimens, sent to Banks, are in the National Herbarium. In one of the letters Crabbe announces his intention of publishing "a short history of all the Trifolia which I have cultivated with so much care for three or four years past,"

and in another gives an interesting sketch of the beach vegetation at Aldeburgh, and speaks of publishing an account of *Trifolium suffocatum* "and a narration of the progressive vegetation of the spot it grows on." Mr. Groves suggests that this may have formed a part of the "Essay" or "Treatise" on botany which Crabbe wrote but afterwards destroyed, in which case "the book might have formed a pioneer essay in plant œcology."

Miss Rachel F. Thompson, who died at Southport on Dec. 9 in her fiftieth year, was associated with Mr. F. J. Hanbury in his work on the *Hieracia*, and drew up the account of this difficult group (of which she had an intimate knowledge) for Messrs. Groves's edition of Babington's *Manual*. She also greatly helped Mr. Hanbury in the mounting and arrangement of the Boswell Herbarium, and in the preparation of the ninth edition of the *London Catalogue*. Rachel Thompson, who was born at York, was a grand-daughter of John Tatham, of Settle, from whose herbarium and memoranda she and her sister extracted a number of records for Mr. Arnold Lees's *Flora of West Yorkshire*; others will be found in a paper by Mr. Whitwell in the *Naturalist* for 1893, pp. 25–40.

Dr. Stapf publishes in the Kew *Bulletin* No. 8 (1906) an exhaustive and interesting paper dealing with the history and botany of "The Oil-grasses of India and Ceylon"—various species of *Cymbopogon* and one each of *Vetiveria* and *Andropogon*, with a plate of *Cymbopogon citratus*. Referring to Hermann's specimen of *C. Nardus* preserved in his herbarium in the Department of Botany, Dr. Stapf says "there is attached to [it] the note—in whose hand I do not know—'*Calamus odoratus officinarum*.'" The name in question is in Linnæus's hand, as are most of those in Hermann's herbarium, which, as is generally known, contains the types of Linnæus's *Flora Zeylanica*.

The ninth number of the Kew *Bulletin* for 1906 brings tc a close the volume for 1906. This volume, of more than 400 pages, is in itself a tribute to the energy and capability of the new Director of Kew Gardens. The eccentricities of the *Bulletin*, culminating in the production of volumes consisting almost wholly of appendixes —the issue for 1904 contains 16 pages!—and the irregularity of its appearance, had made it a journal *pour rire*. It has now become an important publication and bids fair to take a prominent place among botanical periodicals. Being subsidized by the Government, it can be issued at nominal cost—the last number, of over 50 pages, costs only fourpence. This contains descriptions of numerous new species both of flowering plants and algæ, which have been elaborated in connection with the work of the herbarium; papers of economic importance; and biographical information—the last including a lengthy biography of the late G. C. Churchill. The index for the year completes the volume.

There is, we think, still room for improvement in one or two small but not unimportant details. The difficulties which, under the late directorate, prevented the signing of contributions have

been overcome, but we think it is to be regretted that in some cases authors should be represented by initials only. Just now folk can easily ascertain by inquiry who are represented, say, by "W. J. B." and "J. M. H."; but in fifty years' time this will not be so simple a matter. The names of authors are not indexed, and we think that the practice—which we believe was initiated in this Journal, at any rate for this country—of indicating in some special way names published for the first time, is generally recognized as convenient. There is surely no reason why the space at the head of each page should not be utilized for indicating what is below, in accordance with general practice.

Mr. E. M. Holmes's collection of Marine Algæ, the outcome of thirty years' work, has been presented to the University of Birmingham through the generosity of Mr. W. A. Cadbury. The foreign algæ have been selected as far as possible from published fasciculi, and from authentic specimens received from leading algologists, including Perceval Wright (Harvey's species), Agardh, Bornet, Kjellman, Hauck, Reinke, Farlow, Reinbold, Foslie, and many others; as well as a number of types of Japanese and South African algæ. It is almost unique in the fact that, wherever possible, specimens have been carefully remounted to show modes of branching, and a separate sheet has been kept for each variety of a species, and for each form of fruit. The British collection was originally formed with the view of publishing a new edition of the Algæ of *English Botany*, but the project fell through, Many Scandinavian species which at the time of Harvey's classical *Phycologia Britannica* were not known as British, were found on the coasts of Scotland and the North of England, and many French species in the south and south-west of England, through the researches of Mr. Holmes, aided by coadjutors, especially Mr. G. W. Traill of Edinburgh and Mr. E. A. L. Batters at Berwick, Mr. G. Brebner, Mrs. D. Robertson of Cumbrae, and by Mr. R. V. Tellam and H. Goode in Devon and Cornwall. The result of their work was the publication of eleven fasciculi, each containing twenty new British species. In "The Revised List of British Marine Algæ," published in this Journal for 1902, nearly seven hundred and fifty species are enumerated as against four hundred species known at the time of the publication of Harvey's *Phycologia Britannica*. Two of the rarest of these, *Ectocarpus acanthophorus* and *E. Reinboldii*, were discovered by Mrs. Holmes, and have not as yet been found by any one else. The collection also contains the fasciculi of Crouan of the Algæ of Finisterre, which it is believed is found in no other collection in this country. Mr. Holmes's collection of British mosses, largely representing Devon and Cornwall species, was presented to Cambridge University some years ago, by Mr. Thomas Walker, B.A. (Camb.) of Tunbridge Wells, and Mr. Holmes's large collection of British lichens—remarkable for the number of beautifully fruited specimens of rare species, and for the fact that none of the specimens were pressed, but mounted in boxes—was acquired last year by the University College, Nottingham. It contains the majority of British species, including Larbalestier's

fasciculi and many of the rarities found by the late Rev. J. M. Crombie.

THE very useful *Flore descriptive et illustrée de la France*, by the Abbé Coste, to which reference has from time to time been made in these pages, has been brought to a conclusion by the issue of part 7 of the third volume. This contains additions and corrections and a complete index to the whole work. The number of plants considered as entitled to specific rank is 4354; each description is accompanied by a small but excellent figure.

VOL. XXII. of the Journal of the College of Science of the University of Tokyo is devoted to an *Enumeratio Plantarum in Insula Formosa sponte crescentium* by J. Matsumura and B. Hayata, of the Botanical Institute of the College. The volume, which is extremely well but somewhat extravagantly printed and extends to over seven hundred pages, gives a very full bibliography for each species with synonymy and distribution, descriptions of new species and varieties with seventeen excellent plates by Hayata, and a map of the island showing the routes taken by the various travellers on whose collections the book is based.

THIS is how botany is popularized by the *Daily Mail*:—"INSECT DRUNKARDS.—Insects have their own public-houses, and get intoxicated just like human beings, was the charge made yesterday by Professor Bottomley, who lectured on botany at the University of London, South Kensington. The leading public-house in the insect world, according to Professor Bottomley, is the wild arum. It looks like a large lily, and its big, dark shaft extending upwards is the sign that attracts the insects. They climb down into the nectar pit beneath the flower's bags of pollen, and there the orgy commences."

THE Trustees of the British Museum will publish immediately a *List of British Seed-Plants and Ferns* drawn up by Dr. Rendle and Mr. Britten. The nomenclature will be in accordance with the Rules adopted at the Vienna Congress, of which a translation was issued as a supplement to last year's *Journal*. The Rules necessitate a few new combinations, on which we hope to publish some notes in our next issue. For the convenience of non-subscribers and others, the Rules have been issued separately as a shilling pamphlet, which may be obtained from Messrs. West, Newman & Co.

THE last part (vol. ix. pt. 1, December) of the *Icones Plantarum*—which is now edited by Lieut.-Col. Prain, as is also the *Botanical Magazine*—contains much of interest. Mr. Hemsley distinguishes *Aleurites Fordii* from *A. cordata*, with which it has hitherto been confounded, and establishes the new genera *Indokingia* and *Geopanax* (Araliaceæ) and *Neoschimpera* (Rubiaceæ, Psychotrieæ) on plants from the Seychelles, and *Sinowilsonia* (Hamamelidaceæ) from China. Mr. Hemsley also revises *Corylopsis*, with descriptions of two new species. Dr. Stapf revises *Durandea*, under which are twelve species, six of which are new, and establishes a new genus, *Elæophorbia*, for *Euphorbia drupifera* Thonn.

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THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

	PAGE
A New Species of *Splachnobryum*, with Notes on the Peristome. By H. N. Dixon, M.A., F.L.S. (Plate 484 A)	81
Callymenia Larteriæ, n. sp. By E. M. Holmes, F.L.S. (Plate 484 B)	85
Alabastra Diversa.—Part XIV. By Spencer le M. Moore, B.Sc., F.L.S. (Concluded)	87
Notes on the "List of British Seed-Plants." By James Britten, F.L.S., & A. B. Rendle, D.Sc., F.L.S.	99
Hieracium Notes. By Rev. Augustin Ley, M.A.	108
"Huckleberry" as an English Plant-Name	112
Notes on some Tropical African Rubiaceæ. By Spencer le M. Moore, B.Sc., F.L.S.	114
Doctor Sarrasin of Quebec. By M. L. Fernald	117
Bibliographical Notes:— XLII.—Plants of the Antilles	118
Short Notes.—Notes from Cornwall.—A *Fumaria* Hybrid	119
Notices of Books:— Haandbog i Norges Flora af Axel Blytt ... udgivet ved Ove Dahl	120
Postelsia: the Year Book of the Minnesota Seaside Station	121
Die Selbsterhitzung des Heus; eine biologische Studie. Von Dr. Hugo Miehe	122
Recent American Nomenclature.	123
Book-Notes, News, &c.	125

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The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

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LIST OF

BRITISH SEED-PLANTS AND FERNS.

DEPARTMENT OF BOTANY,

BRITISH MUSEUM (NATURAL HISTORY),

CROMWELL ROAD, LONDON, S.W.

LONDON:

PRINTED BY ORDER OF THE TRUSTEES
OF THE BRITISH MUSEUM.

1907

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PREFACE

THE following List of British Seed-plants and Ferns has been compiled by Mr. Britten and myself in accordance with the International Rules of Botanical Nomenclature adopted by the Botanical Congress at Vienna, 1905. These Rules insist on the adoption of the earliest specific name of a plant, no matter under what genus it was first described. This has resulted in a few alterations, as British botanists have generally used the specific name first employed in the genus accepted. These alterations have been made only after careful investigation of the literature of the subject. *Comb. nov.* is affixed to new combinations. A detailed account of the more important alterations will be found in the *Journal of Botany* for March, 1907.

Throughout the List reference is made to the original description of each species. This has necessitated an extensive consultation of botanical literature, which would only be possible in a library such as that possessed by the Department of Botany; a few alterations in spelling (*e.g.*, *Teesdalea*) and some corrected citations have resulted from this investigation.

Names of plants date from the first edition of Linnaeus's *Species Plantarum* (1753). Adherence to priority is observed, except for certain genera specially provided for by the Rules.

The arrangement of Orders is that of Bentham's *Handbook*, which is followed in the Public Gallery; for the limitation of genera and species we have followed Messrs. Groves's edition of Babington's *Manual*, as being the most recent descriptive British Flora; we have not included varieties. We have adopted the nomenclature of the latter work except where this is not in accordance with the Rules. The genera are numbered consecutively throughout.

For the convenience of botanists we have correlated the names adopted in the three principal handbooks of the British Flora. These are indicated by numbers as follows:—

I. Bentham's *Handbook*, ed. 6, 1892;
II. Hooker's *Student's Flora*, ed. 3, 1884;
III. Babington's *Manual*, ed. 9, 1904, in cases where the name is not that adopted in the List.

The List has been shortened by the exclusion of (1) Channel Island plants, which have no claim to be considered as belonging to the British Flora; (2) critical forms of *Rubus*, *Hieracium*, *Euphrasia*, and *Salix*, for which reference must be made to monographs; (3) introduced plants which have not become thoroughly established; (4) plants formerly found in Britain but now extinct.

The names of plants which, although introduced, appear to be naturalized, are printed in italics.

At the end of the List will be found an arrangement of the Natural Orders in conformity with recent views of affinity; this is correlated with the sequence adopted in the List.

A. B. RENDLE.

BRITISH MUSEUM (NATURAL HISTORY).
January, 1907.

A

4

5

3

2

1

B

1

2

3

P. Highley lith

West, Newman imp.

A. Splachnobryum delicatulum *Broth.*
B. Callymenia Larteriæ *Holmes.*

A NEW SPECIES OF *SPLACHNOBRYUM*, WITH NOTES ON THE PERISTOME.

By H. N. Dixon, M.A., F.L.S.

(Plate 484 A.)

In the winter of 1904 Mr. G. Webster sent me for identification a small moss gathered in October of that year on brickwork in a stove or warm forcing-house containing orchids at Baldersby Park, Yorkshire, which upon examination was evidently a *Splachnobryum*. This genus, as is well known, consists entirely of tropical and sub-tropical species, only occurring in temperate regions as an alien, introduced with stove plants, as was the case with the moss gathered in the Botanic Gardens, Glasnevin, Dublin, and referred by Braithwaite (Journ. Bot. 1872) to *S. Wrightii* C. M., a West Indian species; and more recently with a plant gathered in stoves at Cherbourg by Corbière, and described as a new species, *S. Corbieri* Ren. & Card. (Bull. Soc. Roy. Bot. Belgique, xli. p. 311, 1902–3).

The genus *Splachnobryum*, founded by Carl Müller in 1869, is a well-defined one; twenty species were given in the Genera Musc. Frond. of that author in 1901, a number already increased by three in 1902, when the genus was described by Brotherus (Engler & Prantl, *Pflanzenfamilien, Musci*, p. 420). Since that time several fresh species have been described, including *S. Geheebii* Fleisch., *S. rostratum* Broth. & Paris, and *S. Corbieri* referred to above. Comparison with the descriptions and specimens in my possession, and with the collections at Kew and the British Museum (the latter including the types of most of Bescherelle's species) failed to identify the Baldersby plant, and I therefore sent it to Dr. Brotherus, who kindly gave me his opinion that it was an undescribed species. I quote from his letter:—"Diese, wie es mir scheint, neue Art ist mit *S. Wrightii* und *S. Baileyi* verwandt, weicht aber von den erwähnten Arten durch weicheren, dunkelgrünen Blättern, kürzere und dünnere Seta, durch kleinere, kürzere Kapsel und längeren Deckel ab. . . . Ich schlage Ihnen den Namen *S. delicatulum* vor und hoffe dass Sie gelegentlich diese neue Art beschreiben wollen."

Later on in the winter Mr. Webster paid another visit to the spot, but found the plant had almost or quite disappeared. It, however, reappeared the following autumn, and, curiously enough, in October of that year he found the same plant in an orchid-house at Harrogate. In this case the plants were mostly male, and no fruit was present. The orchids in this house were at the time mostly South American species, but this can scarcely be taken as any guide to the origin of the moss, which is doubtless an annual species, and may have occurred in the stoves from year to year for some time past.

The publication of the species has been somewhat delayed for the following reason. When I came to examine the structure of

the peristome for the purpose of drawing up a diagnosis, a somewhat striking peculiarity presented itself, differing from anything I could find in descriptions of the peristome in *Splachnobryum*. It became desirable to compare this structure in other species, but mature capsules in this genus are extremely difficult to obtain, and it was only after considerable delay, and after, I fear, taxing the kindness of numerous correspondents, that I was able to obtain suitable material for comparison; and even now I am quite unable to say whether the particular structure in question is peculiar to the plant under consideration, or whether it may be shared by some other species of the genus. In any case, however, it has been so far undescribed, and is of sufficient interest to call for notice; but involving as it does the somewhat complicated and not generally understood composition of the peristome-teeth in *Splachnobryum*, it is necessary to enter into some detail.

The general structure of the teeth in *Splachnobryum* has been described by Philibert (Rev. Bry. 1890, p. 9) in the course of his admirable series of "Etudes sur le Péristome." The description rests upon *S. Boivini* C. M., the only species of which he was able to obtain specimens showing this structure.

The peristome in *S. Boivini* consists of sixteen narrow teeth, always inserted (a character constant in the genus) at a considerable distance below the mouth of the capsule, and so short as to protrude but little above it. The portion visible above the orifice consists of sixteen narrow, papillose teeth, each with a median line from top to bottom, and resembling closely the less highly developed peristome of many of the Pottioid mosses. The lower concealed part of the teeth, however, which is frequently fully equal in length to the exserted portion, is considerably more complex. A longitudinal section of the capsule, or a transverse section just below the orifice, shows three concentric layers of cells; the outer, forming the capsule-wall, consists of cells considerably elongated in the radial direction, with the outer walls strongly incrassate, and coloured a deep reddish brown, the inner walls being much thinner and paler. Within this row is a ring (as seen in transverse section) of thirty-two cells, much narrower in the radial direction. This ring represents the layer of cells from the innermost walls of which, in the normal peristome of the *Diplolepideæ*, the dorsal plates of the outer teeth are derived, the outer and lateral walls of each cell and a part at least of the upper and lower walls being absorbed, while the inner wall is thickened and remains to form the outer (dorsal) plates; each adjoining pair of the thirty-two cells goes to form one of the sixteen teeth, which appears therefore divided down the middle by a fine median, often zigzag line. In the case of *S. Boivini*, however, while the inner walls are more or less thickened, the remaining walls of these cells do not (in the part of the peristome below the orifice) become absorbed and disappear, but remain; they are not, however, thickened or highly coloured.

The cells of the third ring or layer are (in *S. Boivini*) slightly longer in their radial diameter than in the preceding layer; their walls also persist in their entirety, and thus form a series of closed

chambers between the dorsal plates of the teeth and the inner or ventral plates; it is this innermost series of plates, formed of the inner walls of this third series of cells highly thickened and deeply coloured, which, being continued upwards above the mouth of the capsule, form the only visible part of the peristome when viewed from without. The number of cells in this third layer is considerably greater than the thirty-two of the second, there being two or three of these cells to each of the sixteen teeth. The persistent radial and horizontal dividing walls of these enclosed cells, between the outer and inner plates of the peristome, show, when a tooth is carefully examined from its outer surface, a series of fine vertical and horizontal lines exactly as are seen in the teeth of the peristome in *Splachnum*. On account of this structure (homologous with the peculiar structure of the teeth in *Ptychostomum*), and the Diplolepideous nature of the lower portion of the teeth, Philibert, I think rightly, retains the genus *Splachnobryum* among the *Splachnaceæ*.

With this description of the peristome in *S. Boivini*, I have been able to compare in detail the structure in two species, both in Herb. Mus. Brit.; the one is *S. Sprucei* C. M. (no. 209 b, Musci Amazonici et Andini, = *Weisia splachnifolia* in Mitten, Musci Austr. Americani, p. 141); the other is labelled "Splachnobryum ? n. sp., Dominica, Elliott, 238." The peristomes in these two plants agree closely with one another, and appear to be nearly identical, as far as one can judge, with that of *S. Boivini* as described by Philibert. The inner wall of the second layer of cells forming the dorsal plates of the teeth is probably more thickened and more deeply coloured than in that species, where Philibert describes it as "faiblement colorée." I failed also to observe the median vertical line dividing each tooth in the exserted portion. But the general structure and the relationships of the several layers of cells are the same.

The peristome in the Baldersby plant, however, differs in some respects markedly from the peristome as typified in the three species above described. The outer of the three layers of cells—that forming the capsule-wall—is very similar, except that the inner walls, as well as the outer, are somewhat incrassate and coloured; the second layer of thirty-two cells in circumference is also very similar, only having the walls frequently somewhat more thickened than in those species. It is the third or innermost layer which shows a marked difference. A longitudinal section of the capsule shows the cells of this layer towards the base or insertion of the peristome to be narrow in the radial direction, as in *S. Boivini*; but the two upper cells, which are on a level with the orifice of the capsule, the ultimate one rising a little above it, are very considerably enlarged, the uppermost one especially, so as to appear at times almost inflated; they are thin-walled and perfectly hyaline. Moreover, instead of there being two or three cells opposed to each tooth, there is (in the ultimate row at least) a single cell only, and this being about double the width of the narrow, coloured, exserted portion of the tooth, it appears at first sight, when viewed from

without, like a wide hyaline border to the (apparent) base of the papillose, orange tooth. The outer walls of these hyaline cells not being thickened or coloured, there is therefore no dorsal layer to the peristome as in *S. Boivini*, the whole of the coloured portion of the teeth being derived from the innermost walls; moreover, each tooth being faced (at any rate in the upper part of the concealed portion) by only a single cell, from the inner wall of which it is derived by thickening, it is not divided by any median line, the exserted portion consisting of a narrow linear single row of plates. This constitutes a marked difference in the structure of the teeth from those of *S. Boivini*, *S. Baileyi*, and perhaps most species of the genus. The lowest portion of each tooth near its insertion is, however, usually composed of two rows of plates, passing into a single row before reaching the orifice of the capsule.

The effect of the large hyaline uppermost cells of the third layer is to constitute a form of pre-peristome, consisting of a hyaline ring of cells usually just appearing above the rim of the capsule, and resembling at first sight a ring of persistent annular cells, from which, however, they differ in the apex of each (dorsal view) being truncate, instead of rounded, and of course their origin is entirely different. They may, I think, fairly be described as a pre-peristome, being very nearly homologous with that structure as it appears in certain species of *Orthotrichum*; the principal difference being that there it is formed from the thickened and coloured portion of the outer walls only of a layer of cells, while here it is formed from the whole of the cell, the walls being unthickened and uncoloured.

The following is a diagnosis of the species:—

Splachnobryum delicatulum Broth. *in litt.*, sp. nov. Dioicum. Pusillum. Cæspites densi, *saturate virides*. Caulis tenellus, 3–8 mm. altus, simplex vel parce ramosus, densiuscule foliosus. Folia *mollia*, patentia, apice sæpius leniter patulo-recurvo, concaviuscula, ovata vel oblongo-subspathulata, apice rotundato obtusa, 0·6–1 mm. longa, margine plus minus reflexo, nonnunquam plano, integro vel apice tantum vix crenulato, nervo tenui sub apice evanido sæpe rubello, rete *valde laxo*, *parietibus tenuibus*, chlorophylloso, cellulis pro more *magnis*, *irregulariter hexagono-rhomboideis*, *elongatis*, 40–65 μ longis × 12–16 μ latis, basin versus hyalinis, elongato-rectangularibus, magnis, prope apicem solum breviusculis, ad marginem superiorem seriebus singulis sub-quadratis. Fl. ♂ terminales, nonnunquam laterales, gemmiformes, antheridiis pro more magnis, conspicuis. Fl. ♀ terminales, sæpe quidem et laterales (plerumque archegoniis nudis singulis in foliorum axillis per totum caulem instructis). Seta e vaginula elongata tenuis, 2·5–3 mm. longa, rubra; theca angusta cylindrica *minuta*, 0·5 mm. longa, operculo *conico-rostellato*; peristomii dentes longe sub ore rubro oriundi, angusti, *lineares*, *nec linea media divisi*, papillosi, aurantiaci, inter se raro cohærentes. Ante unumquemque dentem ad inferiorem partem singulæ cellularum series, quarum ultima magna hyalina supra thecæ os paullo exserta, *præperistomium sistentes*, inveniuntur. Sporæ 12–16 μ. læves.

Hab. On brickwork in warm forcing-house, Baldersby Park, Yorkshire, England, Oct. 1904, and Sept. 1905; in similar situation in orchid house, Harrogate, Yorkshire, Oct. 1905. Coll. G. Webster.

Differs from *S. Baileyi* Broth. in the softer leaves, longer, laxer areolation, rostellate lid, &c.; from *S. Wrightii* C. M. in the small size, much shorter seta, smaller capsule, narrow-linear teeth, and other points; from most of the allied species in the longer, looser areolation, as well as in the small capsule with rostellate lid. From all species, so far as hitherto described, in the hyaline pre-peristome. The Glasnevin plant, of which I have not seen a fruiting specimen, resembles it in the leaf form and areolation, but the leaf-margin appears to be plane, and if it is identical with *S. Wrightii*, the fruiting characters would clearly separate it.

Since writing the above, I learn from Mr. Webster that he has found a few barren stems of the *Splachnobryum* in one of the orchid houses in the gardens at York in a position where many hundreds of thousands of Cattleyas have been grown during the past twenty-five years, and where no East Indian species have been cultivated in his recollection. As the plant was associated in its other stations with Cattleyas, the presumption appears to be that it has been introduced with orchids of this genus, and that its derivation is therefore in all probability from the tropical regions of the western hemisphere.

I have to acknowledge gratefully the assistance I have received from Mr. A. Gepp in preparing this description. I may mention that I am sending specimens of the type of *S. delicatulum* to the herbaria at the British Museum and Kew.

EXPLANATION OF PLATE 484 A.—*Splachnobryum delicatulum* Broth., sp. nov. 1, 2, Leaves, × 25; 3, Cells in upper part of leaf, × 125; 4, Portion of peristome, viewed from without, × 125; 5, Longitudinal radial section of capsule-wall and peristome, × 125.

CALLYMENIA LARTERIÆ, N. SP.

BY E. M. HOLMES, F.L.S.

(PLATE 484 B.)

Callymenia reniformis J. Ag. is a variable species, of which Agardh distinguished three varieties:—

1. Var. *cuneata*, illustrated in Kütz. Tab. Phyc. xvii. t. 78, under the name of *Euhymenia divisa*, and in Zanardini, Icon. Phyc. Med. Adriat. tab. 93, figs. 4–5, under the name of var. *Ferrarii*. Kützing's figure shows a short stalk, rapidly widening out into a frond divided into broad wedge-shaped segments with entire margins, reminding one of a large frond of *Dilsea edulis* split up by fissures. Zanardini's figure shows a very short stalk widening out

at the distance of half an inch into a frond about two and a half or more inches wide, and then dividing up in a palmate manner into broad wedge-shaped segments, irregularly lacerate-dentate at the margins. I have not seen this form in Britain, although it is recorded by Mr. Batters in his *Revised List of British Marine Algæ* (1902) for Falmouth and Orkney.

2. Var. *undulata* J. Ag. Agardh does not refer to any illustration of this plant, but his description of its extremely short stem and undulated entire or slightly lobed frond will readily distinguish it when met with. This plant is not unfrequent in South Devon in deep water. It differs also from the typical *C. reniformis* in its brighter colour and slightly thinner consistence.

3. Var. *Ferrarii* J. Ag. Unfortunately Zanardini has adopted this name for a different variety. The illustrations which Agardh cites for his plant—*viz.* Kützing (Tab. Phyc. xvii. tab. 79) and Turner (Hist. Tur. no. 113, fig. *g*)—show a nearly sessile obovate frond with numerous prolifications of the same shape.

Of these three forms, the var. *undulata* is so distinct in habit that it might well be regarded as a distinct species, but I have never met with it with cystocarpic fruit.

During the last twelve months I have received from Miss C. E. Larter, of Combe Martin, North Devon, who has recently taken up the study of marine algæ, a series of specimens so different from all of the three above varieties, that the plant seems deserving of a distinct name. The characters it possesses are constant during the year, since I have received each month specimens with cystocarpic fruit, and presenting the same habit and mode of growth. I therefore propose to characterize it as a distinct species as follows :—

Callymenia Larteriæ, n. sp. Fronde gelatinoso-membranacea fusco-purpurea, a disco radicali in laminam anguste cuneatam, irregulariter fissam, expansa ; prolificationibus numerosis elliptico-ovatis vel oblongis, margine aut raro superficie excrescentibus. Cystocarpiis numerosis, utrinque prominulis irregulariter sparsis.

The colour of the frond is of a duller colour than that of the typical form of *R. reniformis*, or of its var. *undulata*, having more of a brownish red tint. In none of the specimens that I have seen do the prolifications attain the size of the original frond. The plant bears cystocarps throughout the year, scattered over the whole frond, except on the young prolifications. I have seen this plant only from Combe Martin and Torquay.

EXPLANATION OF PLATE 484 B. — *Callymenia Larteriæ* Holmes, sp. nov. 1, Plant, nat. size; 2, Transverse section of thallus, × 180; 3, Section of cystocarp, × 80.

ALABASTRA DIVERSA. — Part XIV.

By Spencer le M. Moore, B.Sc., F.L.S.

New or Little-known African Gamopetalæ.

(Concluded from p. 53.)

Gentianeæ.

Swertia fwambensis N. E. Br. in Fl. Trop. Afr. iv. 574.
In swampy ground near the Kafu River, Uganda; *Bagshawe*, 960.

S. Emini Engl. Pflanzenw. Ost-Afr. C. 314.
Fort Portal, Toro, at edge of swamp; *Bagshawe*, 979.

Borragineæ.

Cordia rubra Hochst. ex A. Rich. Tent. Fl. Abyss. ii. 82.
Above Butiaba, Unyoro; *Bagshawe*, 865.

C. unyorensis Stapf in Journ. Linn. Soc. Bot. xxxvii. 527.
Masinde, Unyoro; *Bagshawe*, 877.

Ehretia angolensis, Bak. in Kew Bull. 1894, 29.
Fort Portal, Toro; *Bagshawe*, 976.

Solanaceæ.

Solanum Naumanni Engl. Bot. Jahrb. viii. 64.
Toro, near Mpanga River; *Bagshawe*, 1120.
Native name "njagi." Fruit eaten.

S. anomalum Thonn. in Schum. & Thonn. Beskr. Guin. Pl. 126.
Kitagueta, Toro; *Bagshawe*, 1122.
Cultivated as a vegetable (the fruit). Native name "njagi."
The single specimen is unarmed, but Mr. C. H. Wright, who kindly examined it, agreed with me as to the determination.

Scrophularineæ.

Diclis ovata Benth. in Comp. Bot. Mag. ii. 23.
Mpanga Forest, Toro; *Bagshawe*, 1012.

Sutera micrantha Hiern in Fl. Cap. iv. sect. 2, 263.
Bulawayo; *Eyles*, 1077.

Stemodiopsis humilis Skan in Fl. Trop. Afr. iv. sect. 1, 316.
Matopo Hills; *Eyles*, 1166.
Flowers white.

Lindernia Whytei Skan in Fl. Trop. Afr. iv. sect. 2, 341.
Near Masinde, Unyoro; *Bagshawe*, 878.

Lindernia Gossweileri, sp. nov. Annua caule ascendente basi ramosa aliter simplici ancipiti rarifolioso, foliis sparsis omnibus oppositis parvis sessilibus ovatis basi late amplexicaulibus margine distanter serrato-dentatis 5-nervibus firme membranaceis, floribus ex axillis superioribus solitatim ortis, pedunculis calyce brevioribus, calyce fere adusque basin partito lobis anguste linearibus acuminatis margine ciliolatis, corollæ tubo calyci æquilongo

cylindrico labio postico obovato integro quam anticum paullulum breviore antici lobis late obovatis obtusissimis margine crispe undulatis, staminibus posticis breviter exsertis anticorum appendice brevi sursum inflexo antheris per paria approximatis loculis haud apice confluentibus.

Hab. Angola, Malange, near Capopa; *Gossweiler*, 1086.

Planta saltem 25 cm. alt,; internodia 3·0–5·0 cm. long. Folia 0·7–1·0 cm. × 0·4–0·9 cm.; subtus pallidiora; costæ pag. inf. eminentes. Pedunculi 0·2–0·6 cm. long. Flores aurei. Calyx totus vix 0·9 cm. long.; lobi sursum patuli 0·75 cm. long., anticus modo 0·45 cm. Corollæ tubus 0·85 cm. long., 0·22 cm. diam.; labium posticum 0·4 × 0·35 cm.; antici lobi 0·45 × 0·35 cm. Antheræ subæquales, 0·08–0·1 cm. long. Ovarium oblongo-ovoideum, glabrum, 0·25 cm. long.; stylus (stigmate incluso) 0·7 cm. long., glaber.

Very close to *L. Whytei* Skan, but a weaker growing plant and almost entirely glabrous. The chief differences are to be found in the more deeply divided nearly glabrous (not pubescent) calyces, and in the somewhat smaller golden (not purple) corollas with smaller and slightly different lobes. This is the plant alluded to by Mr. Skan (*op. cit.*) under *L. Whytei*.

Ilysanthes Muddii Hiern in Fl. Cap. iv. 366.

In marshy ground, Matopo Hills; *Eyles*, 1033.

There is some doubt about this determination. The specimens differ from the type in being smaller and weaker plants with smaller leaves (usually about 0·2 cm. long) and a somewhat shorter and broader calyx, and a slighter smaller corolla. *I. Muddii* was described from Transvaal material.

Striga glandulifera Engl. in Engl. Bot. Jahrb. xxiii. 514.

Valley of the Kafu, Uganda; *Bagshawe*, 819.

Buchnera pulchra Skan ex S. Moore in Journ. Linn. Soc. Bot. xxxvii. 190.

Near the Mpanga River, Kitakwenda; *Bagshawe*, 1052.

Harveya obtusifolia Vatke in Brem. Abhandl. ix. 130.

Near Katwe, Lake Albert Edward; *Bagshawe*, 1024.

Acanthaceæ.

Thunbergia (§ Thunbergiopsis) **microchlamys,** sp. nov. Caule volubili gracili glabro longitrorsum striato, foliis longipetiolatis cordatis apice cuspidato-acuminatis margine undulatis basi 5-nervibus pag. sup. læte viridibus et pilis strigosis appressis sparsissime instructis pag. inf. pallidioribus necnon glaberrimis, flore unico nobis obvio solitario breviter pedunculato, calyce puberulo breviter 6-lobo lobis deltoideis obtusis, bracteolis parvulis ovato-oblongis acutis extus albide piloso-puberulis intus apicem versus pubescentibus trinervibus dilute viridibus, corollæ tubo bracteolas magnopere excedente extus obscure puberulo juxta basin valde attenuato sursum infundibuliformi limbi lobis quam tubus multo brevioribus, antherarum loculis inæqualibus uno calcarato vel calvo altero semper calvo secus suturam barbatis connectivo pro-

ducto, ovario quadrato glabro, stigmate magno infundibuliformi ore triangulari ad angulos laterales barbato inferne extus pubescente.

Hab. Durro Forest, Toro; *Bagshawe*, 1048.

Internodia adusque 20·0 cm. long. Foliorum lamina 9·0–10·0 × 5·5–6·0 cm., tenuiter membranacea, glandulis pellucidis creberrime instructa necnon cystolithis rotundis sparsis pag. inf. prominentibus; petioli 3·5–4·5 cm. long., complanati, basi dilatati, juxta laminam puberuli aliter glabri. Pedunculus 1·2 cm. long., complanatus, ipso sub flore puberulus. Bracteolæ 1·2 × 0·6 cm., siccæ vero modo 1·0 cm. long. Calyx 0·12 cm. alt. Corollæ purpureæ tubus 3·0 cm. long., ima basi 0·4 cm. diam.; inde cito ad 0·13 cm. attenuato, superne 0·8–1·0 cm., faucibus 1·3 cm. diam.; limbi lobi circa 0·6–0·8 cm. long. Antherarum loculis alter ovoideus, 0·3 cm. long., alter oblongus, 0·28 cm. Ovarium 0·2 cm. long., stylus 1·5 cm., stigma 0·6 cm. long., hoc inferne 0·1–0·2 cm., ore 0·5 cm. diam. Capsulæ non suppetunt, sed semina duo dorso reticulata, ventre alte excavata, 0·7 × 0·6 cm.

A single specimen with one flower. The flower apparently crowns a very short lateral branch bearing a pair of small leaves, and if this is the usual inflorescence, the plant is not a typical member of § *Thunbergiopsis*. It finds its nearest affinity with *T. cordata* Lindau, a species not represented in this country, which is described as having narrower leaves on shorter stalks, longer peduncles, somewhat larger bracteoles, blue flowers, a shorter corolla with differently shaped tube, and anthers all with a spur at base.

Hygrophila spinosa T. And. in Thwaites Enum. Pl. Zeyl. 225.

Near Masinde, Unyoro; *Bagshawe*, 871.

A form with very short spines, probably the same as *H. Lindaviana* Burkill, if that be really a distinct species, which Mr. Burkill himself doubts.

Brillantaisia Mahoni C. B. Cl. in Kew Bull. 1906, 251.

Toro, River Bigera and mouth of the Mpanga, at water's edge or in water; *Bagshawe*, 1131.

Very near *B. nitens* Lindau from the Cameroons.

Dyschoriste alba, sp. nov. Erecta, fruticulosa, ramis rigidis elongatis sparsim ramulosis crispe pubescentibus, foliis parvis subsessilibus ovato-oblongis obtusis fac. sup. præsertim secus nervos puberulis fac. inf. pubescentibus, floribus mediocribus in cymis brevibus stricte axillaribus rarius ramulos perbreves terminantibus paucifloris dispositis, calyce satis elongato pubescente vix adusque ⅓ in lobos lineari-setaceos basi ampliatos diviso, corollæ tubo calycem leviter excedente faucibus paullo dilatatis limbo bilabiato labiis tubum circa semiæquantibus, antherarum breviter exsertarum loculis brevissime calcaratis, stylo piloso-puberulo capsula ——.

Hab. Mazoe; *F. Eyles*, 237.

Suffrutex metralis ex schedis cl. collectoris. Folia 1·5–2·5 cm. long., 0·6–1·2 cm. lat., margine leviter undulata, firme membranacea. Flores albi. Calyx totus 1·2 cm. long., 0·2–0·3 cm. diam.; lobi inter se aliquantulum inæquales, ± 0·4 cm long. Corollæ tubus extus pubescens, 1·3 cm. long., deorsum 0·15 cm. faucibus

0·45 cm. diam.; limbus 0·75 cm. long., lobi anguste obovato-oblongi, truncati, 0·5–0·6 cm. long. Flamenta 0·2–0·25 cm. long.; antheræ 0·15 cm., harum calcara modo 0·015 cm. long. Ovarium anguste ovato-oblongum, apice puberulum, 0·2 cm. long.; stylus 1·4 cm. long.

A plant of familiar appearance which I have been unable to name, after examination of all the Museum and Kew material. The affinity is with *D. Fischeri* Lindau, from which it differs in habit, calyx, and much smaller white flowers. The chief points are the long, rigid, sparingly branched stems, the size and lobing of the calyces, and the dimensions of the various parts of the medium-sized white corollas.

Chætacanthus Persoonii Nees in Linnæa xvi. 347.

Matopo Hills; *Eyles*, 1104.

A South African plant recently found by Dr. Bagshawe in the Uganda Protectorate,

This is believed to be the first record for the Southern Tropics.

Mimulopsis Bagshawei, sp. nov. Ramis ramulisque erectis tetragonis mox puberulis novellis pubescentibus, foliis petiolatis ovatis apice cuspidato-acuminatis basi rotundatis leviter cordatis margine impariter crenato-dentatis membranaceis pag. sup. scabriusculis, cymis pedunculatis terminalibus vel ex axillis summis ortis paniculatis sat laxis plurifloris minute pubescentibus, foliis floralibus vegetativa mentientibus sed plane minoribus, pedicellis calyce sæpissime brevioribus pubescentibus, bracteolis quam calyx brevioribus lanceolatis obtusiusculis puberulis, calycis puberuli lobis lineari-lanceolatis vel lineari-oblongis obtusis pro rata abbreviatis, corollæ parvæ tubo calycem excedente basi aliquanto constricto superne amplificato lobis late obovatis apice retusis, staminum anticorum calcare leviter curvato loculum suum fere semiæquante, stigmatis lobo postico abbreviato leviter tuberculoso, ovalis quove in loculo 4.

Hab. Growing in water at Hoima Road, Entebbe; *Bagshawe*, 801.

Planta ultra semimetralis. Foliorum limbus 6·0–8·5 × 3·5–5·0 cm., utrinque cystolithis parvis perspicuis crebro indutus, pag. inf. pallidior, pag. sup. fuscescens; costæ secundariæ utrinque circa 8, quarum juga 2 basi appropinquant, proximales aperte fornicatæ, distales arrecto-arcuatæ; petioli tenues, summum 3·0 cm. long., canaliculati, minute puberuli. Cymæ axillares circa 12·0 cm., terminalis fere 20·0 cm. long. Folia floralia 3·0–0·5 cm. long., juniora gradatim imminuta. Pedicelli solemniter 0·3–0·5 cm. long. Flores albi. Calyx 0·8 cm. long.; lobi 0·6–0·7 cm. × 0·175 cm. Corollæ tubus 1·2 cm. long., ima basi 0·3 cm. faucibus circa 1·0 cm. lat.; lobi 0·8 × 0·6 cm. Staminum anticorum antherarum loculus calcaratus in toto 0·55 cm.; loculus alter 0·3 cm.; antheræ reliquæ 0·28–0·3 cm. long. Ovarium oblongum, superne pubescens, vix 0·3 cm. long. Stylus 1·0 cm. long., piloso-pubescens sub apice glaber. Stigmatis lobus anticus 0·15 cm. long.

Among other points known from the open-cymed species of the genus hitherto described by the short and relatively broad puberulous calyx-lobes coupled with the small corollas.

Paulowilhelmia polysperma Benth. in Hook. Niger Fl. 479.

Near Durro River, Toro; *Bagshawe*, 1090.

An Upper Guinea plant (Sierra Leone to Cameroons) recently found in Buddu by Mr. M. T. Dawe.

Mellera lobulata S. Moore in Journ. Bot. 1879, 225,

Waki River, Unyoro; *Bagshawe*, 836.

This is a Nyassaland, Mozambique, and Usambara plant, which Mr. Scott Elliot discovered growing upon the eastern side of Lake Albert Edward, and therefore somewhere in the neighbourhood of the above habitat.

Dr. Bagshawe notes that the corollas are "a washed-out blue."

Lankesteria elegans T. And. in Journ. Linn. Soc. Bot. vii. 33.

Hitherto found only in the Upper and Lower Guinea Provinces (Ashantee to Corisco Bay).

Barleria (§ Somalia) **matopensis,** sp. nov. Inermis, verisimiliter suffruticosa, ramulis gracillimis pubescentibus dein glabris novellis griseo-tomentillis, foliis parvis manifeste petiolatis lanceolato-oblongis obtusis primo griseo-tomentellis cito pag. sup. læte viridibus glabris cystolithis sat magnis præditis pag. inf. pallidioribus pubescentibus puberulisve, floribus mediocribus in axillis summis solitariis sessilibus, bracteolis foliis consimilibus nisi minoribus, calycis griseo-pubescentis lobo antico ovato-oblongo ab $\frac{1}{3}$ fisso lobulis lineari-lancolatis acutis lobo postico anticum paullo excedente lanceolato-oblongo acuto lobis lateralibus minoribus lanceolatis longiuscule acuminatis, corollæ tubo cylindrico a limbo bene superato limbi lobis obovato-oblongis obtusissimis antico quam reliqui breviore, antheris subexsertis staminibus 2 valde imminutis anantheris quinto vix aspectabili, ovario ovoideo-oblongo sursum breviter attenuato glabro, ovulo quove in loculo unico addito altero ad meram papillam redacto, capsula calycem breviter excedente rostrata disperma.

Hab. Matopo Hills; *F. Eyles*, 1165.

Foliorum lamina 2·0–3·0 cm. long., ± 1·0 cm. lat., margine leviter undulata, basi in petiolum anguste alatum 0·6–0·8 cm. long. desinens. Bracteolæ circa 1·0 cm. long. Calycis lobus posticus 1·5 cm. anticus 1·2 cm. long., hujus lobuli 0·4 cm. long.; lobi laterales 0·9 cm. long. Corolla glabra, dilute violacea, in toto circa 3·5 cm. long.; tubus 1·0 cm. paullulum excedens; lobus anticus 2·0 cm., reliqui 2·3 cm. long. Filamenta 2·5 cm. staminodia 0·2 cm. long,, hæc basi dilatata. Discus undulatus, circa 0·12 cm. alt. Ovarium 0·45 cm. long.; stylus glaber, 3·4 cm. long. Capsula 1·3 cm., ejus rostrum 0·6 cm. long. Semina subrotunda, araneosa, 0·55 × 0·5 cm.

Nearest *B. Hochstetteri* Nees. The sessile flowers, longer and narrower acute calyx-lobes, the anticous ones not entire but bifid, the larger corollas and glabrous capsule, are prominent points of difference.

Asystasia longituba Lindau in Engl. Bot. Jahrb. xxii. 118.

Durro River, Toro; *Bagshawe*, 1046.

A species known only from the Cameroons till Dr. Bagshawe himself gathered it at Entebbe.

Eranthemum nigritianum T. And. in Journ. Linn. Soc. Bot. vii. 51.
Wimi Forest, Toro; *Bagshawe*, 1039.

A West Coast species (Sierra Leone to Angola) which has also been found in the south of the Congo Free State.

Monothecium abbreviatum S. Moore in Journ. Bot. 1900, 466.
Waki River, Unyoro; *Bagshawe*, 833.

The spikes are slender and upwards of 5 cm. long, instead of being broad and short as are those of the type specimen, otherwise there seems little difference. Dr. Bagshawe notes the flowers as being pink.

The specimen is midway between *M. glandulosum* Hochst. and *M. abbreviatum*, which latter should probably now be suppressed.

The type hails from Kavirondo in British East Africa, considerably to the eastward of the new locality.

Justicia betonicoides C. B. Cl. in Fl. Trop. Afr. v. 184.
Fort Portal, Toro; *Bagshawe*, 1017.

Here again we see a considerable extension of range, the distribution of the species hitherto having been British East Africa and Nyassaland.

J. exigua S. Moore in Journ. Bot. 1900, 204.
Toro; *Bagshawe*, 1108.

This species had not previously been found north of Rhodesia.

Adhatoda Engleriana C. B. Cl. in Fl. Trop. Afr. v. 222.
River Waki, Unyoro and Wimi Forest; also forest near mouth of Mpanga, Toro; *Bagshawe*, 867, 1033, 1171.

A considerable westward extension to the range of this eastern species.

Dicliptera laxata C. B. Cl. in Fl. Trop. Afr. v. 258.
Near Masinde, Unyoro; *Bagshawe*, 873.

Another case similar to the preceding, the plant having been found previously only in Nyassaland and the Kavirondo district of British East Africa.

Hypoestes toroensis, sp. nov. Herbacea ramulis e rhizomate tenui crebro radicante ascendentibus foliosis puberulis deinde glabris, foliis petiolatis anguste ellipticis acuminatis apice ipso sæpius obtusis tenuiter membranaceis supra pilis albis appressis sparsim indutis et secus costam centralem minute pubescentibus subtus piloso-puberulis vel fere omnino glabris, involucris cymosis subteretibus bifloris cymis in panicula laxa sæpe elongata foliis intermixta dispositis, bracteolis exterioribus vix omnimodo discretis inter se inæqualibus lineari-lanceolatis obtusis vel obtuse acutis saturate viridibus interioribus itaque fere liberis quam exteriores paullo minoribus oblongis acutis aliquanto decoloribus omnibus puberulis et margine ciliatis, calyce quam bracteæ interiores haud multo breviori sat alte partito lobis linearibus acutis margine ciliolatis, corollæ extus puberulæ tubo involucrum circiter æquante superne gradatim ampliato limbo tubum paullulum excedente labio postico oblongo-obovato obtusissimo antico late oblongo 3-dentato dentibus deltoideis intermedio quam laterales manifeste latiore staminibus exsertis, stylo exserto, stigmate longiuscule impariter

2-ramoso, capsula anguste oblongo-obovoidea puberula, seminibus tuberculis parvis obtectis.

Hab. Wimi River, Toro; *Bagshawe*, 1020.

Folia modice 5·0–12·0 cm. long., 1·5–3·5 cm. lat., supra saturate altrinsecus dilute viridia ibique cystolithis linearibus crebro instructa; costæ secundariæ utrinque circa 6, erecto-ascendentes, vix arcuatæ, petioli 1·5–3·5 cm. long., puberuli. Bracteolæ exteriores ± 1·0 cm. long., pars connata 0·12 cm. long.; interiores 0·5–0·6 cm. Flores lilacini. Calyx 0·45 cm. long., tubus 0·1 cm. Corollæ tubus 0·8 cm. long., ima basi 0·1 cm., infra medium 0·08 cm. superne 0·25 cm. diam.; labia 0·9 cm. long. Filamenta complanata, glabra, 0·9 cm. long. Ovarium fere 0·3 cm. long.; stylus glaber 1·0 cm.; stigmatis ramus alter 0·1 cm. alter 0·08 cm. long. Capsula 0·8 cm. long., a medio 4-sperma. Semina 0·1 cm. diam.

Easily distinguishable from *H. rosea* Beauv. by the narrow leaves, the inflorescence, and the small involucres and corollas.

Verbenaceæ.

Premna angolensis Gürke in Engl. Bot. Jahrb. xviii. 165.

Mpanga Forest, Toro; *Bagshawe*, 1096.

Only a Lower Guinea plant hitherto.

Clerodendron melanophyllum (*Premna melanophylla* S. Moore in Journ. Linn. Soc. Bot. xxxvii. 196, and in Journ. Bot. 1906, 89). This plant, with its relatively long and slender tube and exserted stamens, is certainly not a *Premna*, although it agrees with that genus in habit rather than with *Clerodendron*. The same remark, except as to the habit, refers also to *P. macrosiphon* Bak., with which *C. melanophyllum* is no doubt allied.

C. rotundifolium Oliv. in Trans. Linn. Soc. Bot. xxix. 132, *var.*

East Toro; *Bagshawe*, 1110.

Differs from the type in the short pubescence, nearly entire leaves slightly cordate at the base, and corolla of somewhat longer tube with a gradual (not abrupt) swelling at the throat. In some respects it approaches *C. Guerkei* Bak., which will probably have to be merged in *rotundifolium* when more material comes to hand. Dr. Bagshawe notes the plant as common on ant-hills. The flowers are white.

C. Bakeri Gürke in Engl. Bot. Jahrb. xviii. 175.

Near Hoima, Unyoro; *Bagshawe*, 941.

An Upper Guinea and Lower Congo plant.

Clerodendron oreadum, sp. nov. Scandens ramis patentissimis bene foliosis minute pubescentibus dein glabris eximie sulcatis, foliis parvis 3–4-nis petiolatis ovato-oblongis cuspidato-acuminatis basi obtusis vel subrotundis margine integris membranaceis utrinque glabris, floribus parvulis in cymis terminalibus brevipedunculatis laxe paniculatis folia subæquantibus pubescentibus digestis, bracteis parvis filiformibus pubescentibus, pedicellis calycibus brevioribus, calycis parvuli turbinato-campanulati pubescentis lobis anguste lineari-lanceolatis acutis, corollæ extus puberulæ tubo calycem duplo excedente lobis brevibus oblongo-obovatis

obtusissimis, staminum parte exserta corollæ tubo æquilonga, stylo breviter exserto.

Hab. Toro, in the forest near Mpanga and on the River Bigera; *Bagshawe*, 1075 and 1123.

Folia modice 3·0–7·0 cm. long., 2·0–3·0 cm. lat., in sicco viridia; costæ secundariæ 2 basales valde perspicuæ et ita folia trinervia habeantur, costæ reliquæ utrinque circa 5 aliæ ascendentes aliæ paullo minus perspicuæ patentissimæ; petioli 0·5–1·2 cm. long., graciles, puberuli. Paniculæ (pedunculo 1·5–2·0 cm. long. incluso) 4·0–6.0 × 4·0–5·0 cm., ramuli patentes, graciles. Bracteæ circa 0·2–0·3 cm. long. Flores albi. Calyx totus (humectatus) 0·3 cm., lobi 0·1 cm- long. Corollæ tubus 0·65 cm. long., 0·1 cm. diam., lobi 0·2 × 0·12 cm. Antheræ oblongæ, 0·15 cm. long. Ovarium 0·125 cm., stylus 0·8 cm. long.

Differs from *C. nuxioides* (*Siphonanthus nuxioides* S. Moore) in the small leaves obtuse or rounded at the base, the short inflorescences, much smaller calyx and corolla, the former pubescent, &c. It is nearer still to the plant named by Baker (Fl. Trop. Afr. v. p. 290) *Premna macrosiphon*, but which is, I venture to think, a *Clerodendron*; this, however, has rusty stems, much larger leaves with rusty petioles, and larger lobes to calyx and corolla among other features.

Vitex isotjensis Gibbs in Journ. Linn. Soc. xxxvii. 463.

Bulawayo, on granite formation; *Eyles*, 1201.

A large shrub with heliotrope flowers. On the Matopos it is a tree 7 m. high according to Miss Gibbs (*l. c.*).

Labiatæ.

Orthosiphon Hildebrandtii Bak. in. Fl. Trop. Afr. v. 372.

Kibero, Lake Albert; *Bagshawe*, 906.

A British East African species.

O. shirensis Bak. in Fl. Trop. Afr. v. 368.

Sebakwe, very common; *Eyles*, 71.

A Nyassaland plant, first found in Rhodesia by Dr. Rand in 1898.

Æolanthus (Euæolanthus § Truncata) **crenatus,** sp. nov. Caule sat elato lignoso ramoso microscopice puberulo, foliis parvulis manifeste petiolatis nunc spathulato-oblongis nunc oblongo-obovatis nonnunquam late obovatis obtusissimis basi subito vel gradatim attenuatis margine perspicue crenatis basin versus equidem integris crassiusculis utrinsecus puberulis, floribus pro rata parvis sessilibus in spicastris laxe ramosis prolixis paniculatis dispositis, verticillastris 1–2-floris, bracteis parvis lanceolatis vel oblongo-lanceolatis obtusis calyce longioribus, calyce florescente anguste campanulari ore denticulato extus puberulo, calycis fructescentis parte decidua oblonga sursum paullulum angustiore partem persistentem excedente, corollæ extus puberulæ tubo angusto sursum gradatim leviter amplificato limbi labiis comparate latis antico quam posticum paullo longiore.

Hab. Matopo Hills; *Eyles*, 1013.

Stirps saltem 35 cm. alt. Caulis 0·25 cm. diam., in sicco

brunneus. Foliorum limbus 0·6–1·0 × 0·4–0·6 cm.; petioli crassiusculi, puberuli, 0·2–0·4 cm. long. Inflorescentia 20 cm. long., 10·0 cm. diam., ejus rami rigidiusculi, patuli, multiflori, puberuli. Flores dilute punicei. Bracteæ circa 0·2 cm. long., puberulæ, ut calyx fusco-coloratæ. Calyx florescens 0·125 cm. long., 0·1 cm. lat., fructescens totus circa 0·3 cm. long., basi 0·1 cm. superne 0·075 cm. lat., pars persistens vix 0·1 cm. alt. Corollæ tubus 0·5 cm. long., basi 0·04 cm. superne 0·12 cm. lat.; labium anticum ovatum 0·35 cm. long., basi 0·22 cm. lat.; posticum 0·3 cm. long., 0·2 cm. lat.; lobi rotundati 0·08 cm. long. Antheræ 0·05 cm. diam. Nuculæ puberulæ, circa 0·075 cm. long.

In flower somewhat like *Æ. petasatus* Briq. according to the figure—I have not seen a specimen—but the calyx has distinct though very short toothlets, and is relatively longer and narrower in fruit; the corolla is broader in the lips, and the nutlets are not glabrous. In habit and leaf there is considerable difference between the two species.

Plectranthus selukwensis N. E. Br. in Kew Bull. 1906, 167.

Mazoe, growing in crevices on the Iron-mask Mt.; *Eyles*, 200. "Root woody, soft, saturated with water, filling the crevice."

Coleus (§ Solenostemonoides) **toroensis**, sp. nov. Herbaceus caule ascendente inferne nudo superne paucifolioso valido puberulo dein glabro, foliis majusculis oblongo-obovatis obtusis basi in petiolum brevem alatum angustatis margine grosse crenatis tenuiter membranaceis utrobique costis costulisque puberulis neglectis fere glabris, floribus in spicastro subracemiformi-paniculato brevi terminali brunneo-pubescente quam folia breviori digestis, bracteis lanceolatis vel lanceolato-linearibus acutis margine ciliolatis pedicellos bene excedentibus, verticillastris circa 6-floris, pedicellis quam calyx brevioribus brunneo-pubescentibus, calycis campanulati puberuli lobo postico amplo rotundato margine sparsissime ciliolato lobis reliquis inter se fere æqualibus e basi lata subulato-setaceis ciliolatis, corollæ mediocris tubo ima basi erecto inde subito ad angulum fere rectum subito curvato et mox cursu adverso iterum refracto faucibus amplificatis labio antico late cymbiformi apice integro postico quam anticum breviore subæqualiter 4-lobo.

Hab. In the forest near Durro River, Toro; *Bagshawe*, 1043.

Planta (ex schedis cl. detectoris) fere ⅔ metralis. Foliorum limbus circa 10·0 × 5·0–6·0 cm., glandulis pellucidis microscopicis copiosissime indutus; costæ secundariæ utrinque circa 5, ascendentes; petioli circa 1·0 cm. long., puberuli. Panicula nondum profecto evoluta modo 5·0 cm. long. Bracteæ diuscule persistentes, 0·3–0·6 cm. long. Pedicelli summum 0·2 cm. long. Flores lutei. Calyx totus 0·45 cm., long. ore fere 0·4 cm. diam.; lobus posticus 0·2 × 0·2 cm.; lobi reliqui 0·15–fere 0·2 cm. long. Corollæ tubi pars basalis erecta 0·2 cm. long., 0·175 cm. lat.; pars fere horizontalis 0·2 cm. long., circa 0·1 cm. lat.; pars ampliata 0·55 cm. long. basi 0·15 cm. faucibus 0·5 cm. lat.; labium anticum ægre 1·0 cm. long.; posticum 0·7 cm. long., hujus lobi obtusissimi, 0·15–0·2 cm. long. Antheræ leviter exsertæ; filamentorum pars connata 0·45 cm.,

libera 0·6 cm. long. Stylus breviter exsertus; stigmatis lobi crassiusculi, 0·06 cm. long. De calyce fructescente sileo.

Looks much like *C. decurrens* Gürke, but differs in the shortly stalked, coarsely crenate leaves, the short subracemose inflorescence, the ampler calyx with broader hind lobe and somewhat longer front and side ones, the remarkably curved tube of the corolla, the exserted stamens, and somewhat fleshy stigma-lobes.

Coleus (§ Solenostemonoides) **polyanthus,** sp. nov. Verisimiliter herbaceus caule erecto rariramoso minute pubescente, foliis ovatis obtusis vel obtuse acutis basi in petiolum sat longum angustatis vel obtusissimis margine crenato-serratis dimidio proximali vero integris utrobique minute pubescentibus membranaceis, spicastris terminalibus folia longe excedentibus pubescentibus e verticillastris 1-floris permultis quasipaniculatis compositis, bracteis parvulis cito deciduis lanceolatis vel lanceolato-linearibus acutis minute pubescentibus viridibus, floribus parvis breviter pedunculatis, calycis florescentis parvuli campanulati intus nudi tubo limbo æquilongo fulvo-tomentoso limbi lobis lineari-lanceolatis obtusis vel obtusiusculis anticis quam reliqui paullulum brevioribus omnibus viola tinctis extus pubescentibus intus albo-villosulis, corollæ extus pubescentis tubo prope medium valde curvato deorsum tenuissimo sursum campanulato-infundibulari labio antico quam posticum cymbiforme magnopere incurvum breviore et 4-lobo, filamentis ima basi connatis, nuculis subrotundis a calyce fruct. antice maxime gibboso sursum gradatim attenuato occlusis.

Hab. In stony ground on the Matopo Hills, at 5000 ft.; *Eyles,* 1012.

Planta saltem 30 cm. alt. Folia 2·5–3·5 × 1·2–1·5 cm., pilis glandulosis microscopicis creberrime donata, in sicco viridi-flavescentia; petioli ± 1·0 cm. long., basi aliquantulum dilatati, minute pubescentes. Spicastra summum 15·0 cm. long. Bracteæ 0·2 cm. long. Calyx florescens 0·15 cm. long.; fructescens 0·3–0·4 cm. long., basi 0·2 cm., ore 0·1 cm. lat. Flores heliotropini. Corollæ tubi pars attenuata 0·3 × 0·075 cm., pars expansa basi 0·1 cm. faucibus fere 0·4 cm. lat.; labii antici 0·35 cm. long. lobi laterales abbreviati, terminales rotundati, 0·1 cm. long.; labium posticum 0·5 cm. long. Antheræ 0·05 cm. long. Nuculæ vix 0·1 cm. diam., leves, pallidæ.

Though quite different in habit and foliage from *C. nyikensis* Baker from Nyassaland, there is much resemblance between the two in the inflorescence. Among other points may be mentioned the smaller flowering and longer and narrower fruiting calyx of the Rhodesian plant, and its corolla with a larger and basally much more narrow tube.

Coleus (§ Stolenostemonoides) **matopensis,** sp. nov. Herbacea caule ascendente sparsim ramoso ramis foliosis minute glanduloso-pubescentibus pilis longioribus necnon sparsioribus intermixtis in nodis barbatis, foliis longipetiolatis mediocribus late ovatis obtusis basi latissime cordatis rarius truncatis margine grosse crenato-serratis membranaceis pilis appressis longiusculis albis utrinque instructis, verticillastris circa 7-floris pedunculatis subdistantibus

sat laxis in paniculam gracilem terminalem folia longe excedentem dispositis, bracteis imis folia mentientibus sed quam ea multo minoribus reliquis maxime imminutis linearibus, pedicellis calyce brevioribus, calycis florescentis parvuli campanulati hispiduli intus calvi lobis inter se fere æqualibus lanceolatis acutiusculis calyce fructescente parum aucto erecto superne 10-nervoso, corollæ mediocris tubo valde curvato inferne tenero superne subito dilatato labii postici lobis 4 brevibus obtusissimis labio antico posticum excedente cymbiformi.

Hab. Matopo Hills. No. 1024.

Planta saltem 30 cm. alt. Folia 4·0–5·0 cm. long., 3·0–4·0 cm. lat. (raro adusque 6·0 cm. lat. et tunc late rotundata), juniora circa 2·0 × 2·0 cm., basi 3·5-nervia; petioli modice 3·5–7·5 cm. long., graciles, albo-pilosi. Panicula circa 12·0 cm. long., minute glanduloso-pubescens adjectis pilis paucis strigosis albis; verticillastrorum stipites 1·0–1·5 cm. long. Bracteæ imæ petiolatæ. in toto 1·0 cm. long.; reliquæ 0·3–0·5 cm. Pedicelli tandem modo 0·2 cm. long. Flores violacei. Calyx florescens 0·25 cm. long.; hujus lobi 1·5 cm. Calyx fructescens 0·45 cm. long., antice manifeste gibbosus. Corollæ tubi pars tenera 0·4 cm. long., 0·075 cm. lat.; pars ampliata 0·4 × 0·3 cm.; labium posticum 0·2 cm. anticum 0·6 cm. long. Filamenta breviter connata. Nuculæ ovoideæ, brunneæ, leviter nitescentes, 0·1 cm. long.

Habit and inflorescence much as of *C. aconitiflorus* Welw., but the leaves are quite different and the flowers smaller.

This is not a good member of the section, inasmuch as the ripe calyces show no sign of turning downward; but I do not know where else to put it.

Achyrospermum parviflorum, sp. nov. Herbaceum caule erecto sursum ramoso subtereti primo minute fulvo-tomentello dein pubescente puberulove, foliis ovatis acuminatis a basi rotundata subito vel paullo magis gradatim in petiolum sat longum gracilem haud alatum attenuatis margine serrato-crenatis membranaceis pag. sup. præter costas puberulas necnon pilos strigosos albos sparsos et altrinsecus costas minute pubescentes glabris, spicastris brevibus oblongis terminalibus vel ramulos laterales breves coronantibus, verticillastris a me scrutatis 5-floris, bracteis late ovatis brevissime cuspidulatis apice ipso obtusiusculis minute glanduloso-pubescentibus margine ciliatis, calyce recto extus pubescente fructificante parum aucto limbo plane bilabiato labii antici lobis inter se omnino liberis quam postici majoribus omnibus anguste lanceolatis obtusiusculis, corollæ parvæ tubo breviter exserto superne ægre amplificato extus pubescente labio postico rotundato emarginato antici lobo intermedio late oblongo-obovato brevissime bifido, stylo incluso, stigmatis lobis ambobus brevissimis, nuculis puberulis harum squamellis se ipsas excedentibus spathulatis vel oblongo-obovatis margine terminali longiuscule ciliatis.

Hab. Budongo Forest, Unyoro; *Bagshawe*, 927.

Foliorum limbus solemniter 6·0–9·0 cm. × 2·5–5·0 cm. (accedunt folia alia minora juvenilia ± 2·5 × 1·3 cm.), glandulis pellucidis

copiosissime obsessus; petioli summum 2·5 cm. long., minute pubescentes. Spicastra 2·3–3·0 cm. long. Bracteæ 0·5 × 0·35 cm. Flores punicei. Calyx florescens in toto 0·6 cm. long., ore 0·3 cm. diam.; hujus labium anticum vix 0·25 cm. long.; lobi inferne 0·1 cm. lat.; labium posticum 0·125 cm. long., lobi inter se æquales, 0·1 cm. long., lobi omnes patule ciliolati. Calyx fructescens 0·8 cm. long. Corollæ tubus 0·65 cm. long., ima basi 0·125 cm. sub limbo 0·2 cm. lat.; labium posticum vix 0·1 cm. long., antici lobi laterales rotundati, obtusissimi, 0·1 cm. long., intermedius 0·2 × 0·175 cm. Antheræ 0·05 cm. long. Stylus 5·5 cm. long. Nuculæ modo non 0·1 cm., earum squamellæ 0·125 cm. long.

Nearest *A. æthiopicum* Welw., an Angolan species, which has winged petioles to the leaves, larger and somewhat differently shaped bracts, larger calyces of which the two front lobes are connate nearly to the top, larger white corollas, &c.

Leonotis longidens, sp. nov. Herba elata caule erecto valido sparsim ramoso alte quadrisulcato minute pubescente ramulos breviores bene foliosos dilute fulvo-tomentosos hac atqne illac gignante, foliis manifeste petiolatis oblongis vel oblongo-lanceolatis obtusis basi rotundatis margine crenato-serratis firme membranaceis pag. sup. patule pubescentibus altrinsecus molliter albotomentellis, verticillastris distantibus multifloris ex axillis foliorum summorum aliquanto angustatorum ortis, bracteis quam calyces brevioribus angustissime linearibus apice breviter spinoso-acuminatis pubescentibus, floribus pedicellis brevissimis insidentibus, calycis tubo superne paullo ampliato pubescente ore 8-dentato dente postico valde elongato rigido reliquis brevioribus inter se parum inæqualibus omnibus basi amplificatis apice spinosis, corollæ dilute aurantiacæ (in sicco equidem fulvæ) tubo cylindico parte exserta villosa parte inclusa fere glabra intus glabro labio postico tubum fere subæquante.

Hab. Entebbe, Uganda; *Bagshawe*, 829.

Herba ex schedis cl. Bagshawe "9 feet" alt. Caulis infra verticillastrum imum 0·7 cm. diam. in sicco brunnescens. Folia 3·0–6·0 cm. long., 1·5–2·5 cm. lat.; costæ secundariæ utrinque 6, ascendentes, fac. inf. valde perspicuæ; petioli 0·5–2·0 cm. long., fulvo-tomentelli. Verticillastri corollis exemptis 5·0–6·0 cm. diam. Bracteæ circa 1·0–1·5 cm. long. Pedicelli 0·1–0·2 cm. long., pubescentes. Calyx totus 2·6 cm. long., tubus 1·6 cm. long., juxta basin 0·2 cm. superne 0·5 cm. diam., hujus nervi deorsum ægre aspectabiles sursum eminentes; dens posticus 1·0 cm. long., basi 0·2 cm. lat.; dentes reliqui 0·25–0·4 cm. long., omnes pubescentes. Calyx fructescens paullo auctus, e. g. totus 3·0 cm. long., tubus 1·75 cm. et dens posticus 1·25 cm. long. Corollæ tubus 2·0 cm. long., 0·3 cm. diam.; labium posticum 1·5 cm. long.; anticum 0·7 cm. long., fere glabrum.

A species easily recognized by the pale orange flowers, together with the very long and prominent posticous tooth of the calyx. The affinity seems to be with *L. mollissima* Gürke.

NOTES ON THE "LIST OF BRITISH SEED-PLANTS."

By James Britten, F.L.S., & A. B. Rendle, D.Sc., F.L.S.

The following notes have been drawn up to explain the more important alterations in nomenclature which have been made in the *List of British Seed-Plants and Ferns* just published by the Trustees of the British Museum. The general plan and scope of the *List* is explained in the preface thereto, to which these notes are supplementary. As stated in the preface the alterations are mainly due to the adoption of the earliest specific name, in accordance with the International Rules of Botanical Nomenclature adopted by the Botanical Congress at Vienna in 1905, and to a careful investigation of the literature of the subject. This has led us to restore certain genera which do not appear in the list of "nomina rejicienda" appended to the Rules, and which therefore by the law of priority must stand. Our investigations have incidentally shown that the work of some of the earlier British botanists—*e. g.* Hill, Miller, and S. F. Gray—has been inadequately appreciated by continental workers. We have occasionally corrected the authority on which a genus or species stands in British books.

The number prefixed to each genus is that which it bears in the *List*.

4. Adonis annua L. Sp. Pl. 547 (1753); Mill. Dict. ed. 8, n. 1 (1768). This name must stand for *autumnalis* L. (Sp. Pl. ed. 2, 771, 1762) and authors. *A. annua* L. originally included two species which Linnæus in his second edition distinguished by the names *æstivalis* and *autumnalis*. *Annua* must be retained for one of the two, and Miller was the first to restrict it to this plant.

6. Ranunculus divaricatus Schrank, Baiersche Flora, ii. 104 (1789). A large consensus of European botanists, including Aschersson (Flor. Brandenburg, 12), Grenier & Godron (Flor. France, i. 25), Neilreich (Fl. Nieder-Osterr. 683), and Koch (Synops. i. 12) agree that this is identical with the later *R. circinatus* Sibth. Fl. Oxon, 175 (1794).

12. Delphinium Ajacis L. Sp. Pl. 531 (1753). We see no reason for dissociating the British plant from that of the *Hortus Cliffortianus*, cited by Linnæus for this species, and now in the Department of Botany. The name is attributed to various authors in the British floras.

24. Fumaria Bastardi Boreau in Duchartre, Rev. Bot. ii. 359 (1846–7). The identity of this with *F. confusa* Jord. (in Cat. Dijon, 1848) is asserted by Boreau (Flor. Centre France, ii. 34, 1847), who had seen an authentic specimen of Jordan's plant; it is also recognized by Mr. Pugsley (Journ. Bot. 1902, 180).

27. Radicula Nasturtium-aquaticum comb. nov. Linnæus (Sp. Pl. 657) described this as "*Sisymbrium Nasturtium* ▽ : m." We have

restored the earliest trivial, and, in accordance with Art. 26 of the Vienna Code, have transcribed the symbol.

R. SYLVESTRIS Druce in Ann. Scott. Nat. Hist. 1906, 219 = *Sisymbrium sylvestre* L. Sp. Pl. 657 (1753).

28. BARBAREA LYRATA Aschers. Fl. Brandenb. i. 35 (1864). The synonymy is as follows :—

Erysimum Barbarea L. Sp. Pl. 660 (1753).
E. lyratum Gilib. Fl. Lit. ii. 59 (1782).
B. vulgaris Ait. Hort. Kew. ed. 2, iv. 109 (1812).

Rule 55 of the Vienna Code forbids the repetition of the generic name as a trivial.

B. VERNA Aschers. *op. cit.* 36. The synonymy is as follows :—

Erysimum vernum Miller, Gard. Dict. ed. 8, no. 3 (1768).
E. præcox Sm. Fl. Brit. ii. 707 (1800).
B. præcox Ait. Hort. Kew. ed. 2, iv. 109 (1812).

29. ARABIS GLABRA Bernhardi Syst. Verz. Erfurt. 195 (1800) = *Turritis glabra* L. Sp. Pl. 666 (1753).

34. ALLIARIA ALLIACEA comb. nov. :—

Erysimum Alliaria L. Sp. Pl. 660 (1753).
E. alliaceum Salisb. Prodr. 270 (1796).
Alliaria officinalis Andrzj. in Bieb. Fl. Taur.-Cauc. iii. 445 (1819).

45. TEESDALEA Br. We restore Brown's original spelling.

50. CORONOPUS Gaertn. Fruct. ii. 293 (1791). This antedates *Senebiera* DC. in Mém. Soc. Hist. Nat. Paris, 1799, 140, and necessitates the restitution of *C. procumbens* Gilib. Fl. Lit. ii. 52 (1782), and *C. didymus* Sm. Fl. Brit. ii. 691 (1800).

57. VIOLA SYLVESTRIS Lamarck, Fl. France, ii. 680 (1778). This is synonymous with *V. canina* L., but is restricted by Reichenbach (Fl. Germ. Excurs. 707, 1832) to the plant otherwise known as *V. sylvatica* Fries.

62. SILENE LATIFOLIA comb. nov.

Cucubalus Behen L. Sp. Pl. 414 (1753).
C. latifolius Mill. Dict. ed. 8, no. 2 (1768).
Behen vulgaris Moench, Method. 709 (1794).
S. Cucubalus Wibel, Prim. Flor. Werthem. 241 (1799).
S. inflata Smith, Fl. Brit. 467 (1800).

The earliest unoccupied trivial, as the synonymy shows, is *latifolius*, *Behen* being already used by Linnæus for another species of *Silene*. Miller's description and his specimens in the National Herbarium leave no doubt as to the identity of his plant. *S. latifolia* Poir. is an obscure plant which has been referred to *S. italica* Pers.

64. SAGINA SAGINOIDES Dalla Torre, Anleit. Alpenfl. 75 (1882) = *Spergula saginoides* L. Sp. Pl. 441 (1753).

66. MINUARTIA TENUIFOLIA Hiern in Journ. Bot. xxxvii. 321 (1899) = *Arenaria tenuifolia* L. Sp. Pl. 424 (1753).

70. STELLARIA NEGLECTA Weihe in Bluff & Fingerhuth Comp.

Fl. Germ. i. 560 (1825). We follow the authors who combine *S. umbrosa* Opiz (Seznam, 93, 1852) with this.

71. Myosoton Moench, Method. 225 (1794) antedates *Malachia* Fries Fl. Halland. 77 (1817)—a name usually printed *Malachium*.

72. Cerastium cerastoides Britton in Mem. Torr. Bot. Club, v. 150 (1894) = *Stellaria cerastoides* L. Sp. Pl. 422 (1753).

89. Oxalis corniculata L. and O. stricta L. Following Dr. B. L. Robinson (Journ. Bot. 1906, 386), the usual application of these names is transposed.

102. Melilotus Petitpierreana Hayne et Willd. Hort. Berol. 790 (1809). An earlier name for *M. arvensis* Wallr. Sched. Crit. i. 391 (1822), with which it is recognized as identical by Nyman and others.

113. Arthrolobium pinnatum comb. nov. The earliest name for this species is *Scorpiurus pinnata* Mill. Dict. ed. 8, no. 5 (1768). Miller refers to Morison's Plant. Hist. ii. 127, and there seems no doubt that Morison's plant is the one generally known as *A. ebracteatum*.

121. Alchemilla argentea G. Don ex Trevelyan, Veg. Faroe Islands, 10 (1837) = *A. conjuncta* Bab. in Ann. Mag. Nat. Hist. x. 25 (1842). *A. argentea* Lam. Fl. France, iii. 303 (1778) = *A. alpina* L.

123. Potentilla Crantzii Beck; Fl. Nied.-Oesterr. 760 (1892) = *Fragaria Crantzii* Crantz Inst. Rei Herb. ii. 178 (1766); *P. rubens* Vill. Prosp. 46 (1799).

P. sterilis Garcke, Fl. Deutschl. ed. 4, 112 (1858) = *Fragaria sterilis* L. Sp. Pl. 495 (1753), and thus displaces *P. Fragariastrum* Ehrh.

129. Rosa hibernica Templeton in Trans. Dubl. Soc. iii. 164 (1804) is generally regarded as a hybrid, and is therefore omitted.

142. Sedum purpureum Tausch in Flora xvii. 515 (1834) = *S. Fabaria* Koch, Syn. Fl. Germ. i. 258 (1836).

145. Saxifraga rosacea Moench, Method. 106 (1794). Generally cited as *S. decipiens* Ehrh., which, however, was published without description and is cited by Moench as a synonym of his plant.

158. Trinia glauca H. G. L. Reichenbach, Iconograph. v. 25 (1827) = *Pimpinella glauca* L. Sp. Pl. 264 (1753).

160. Carum majus comb. nov. The first description of this as distinct from *Bunium Bulbocastanum* L. is by Gouan (Illustr. 10, 1773) as *Bunium majus*. Stokes (in With. Arrang. ed. 2, i. 277) says Gouan's is an improper name, as the synonym quoted by him is *B. Bulbocastanum* L.; but his description is correct.

164. Œnanthe aquatica Poiret in Lam. Encycl. iv. 530 (1798?) = *Phellandrium aquaticum* L. Sp. Pl. 255 (1753); *Œ. Pheliandrium* Lam. Fl. France, iii. 432 (1778).

179. Torilis Anthriscus Bernhardi, Syst. Verz. Erfurt. 167 (1800). This plant is cited by Babington as of Gaertner, but *T. Anthriscus* Gaertn. is a synonym of *Chærophyllum Anthriscus* Lam.

T. ARVENSIS Link, Enum. i. 265 (1821) = *Caucalis arvensis* Hudson, Fl. Angl. 98 (1762); *T. infesta* Sprengel, Pl. Umbell. Prodr. 24 (1813), *Scandix infesta* L. Syst. ed. 12 (1767).

198. KENTRANTHUS Necker. We have restored the original spelling.

205. PETASITES OVATUS Hill, Herb. Brit. i. 28 (1769) = *Tussilago Petasites* L. Sp. Pl. 866 (1753); *P. officinalis* Moench, Method. 568 (1794).

211. LINOSYRIS VULGARIS DC. Prodr. v. 352 (1836). This is quoted in the *Index Kewensis* as of "Cass. ex Less. Syn. Comp. 195" (1832), but the name in Lessing stands as a synonym of *Crinitaria Linosyris*, and by Art. 37 of the Vienna Code a name quoted in synonymy is not effective publication.

212. INULA VULGARIS Trevisan, Fl. Eugan. 29 (1842). The synonymy is as follows:—

Conyza squarrosa L. Sp. Pl. 861 (1753).

C. vulgaris Lam. Fl. France, ii. 73 (1778).

Inula Conyza DC. Prodr. v. 464 (1836).

The Linnean trivial cannot be retained for this plant, as there is an *I. squarrosa* L., Sp. Pl. ed. 2, 1240 (1763).

213. PULICARIA PROSTRATA Ascherson, Fl. Brandenb. i. 304 (1864) = *Inula Pulicaria* L. Sp. Pl. 882 (1753); *I. prostrata* Gilib. Fl. Lituan. i. 205 (1781); *P. vulgaris* Gaertn. Fruct. ii. 461 (1791).

P. DYSENTERICA S. F. Gray, Nat. Arr. ii. 463 (1821). This species is generally attributed to Gaertner, Fruct. ii. 462 (1791), but Gaertner does not make the combination; he merely cites *Inula dysenterica* as belonging to his genus.

216. ANTENNARIA MARGARITACEA Br. ex Less. Syn. Comp. 354 (1832). This is generally cited as of Brown in Trans. Linn. Soc. xii. 123 (1817), but Brown does not there make the combination.

225. SENECIO INTEGRIFOLIUS Clairville, Man. Herbor. 241 (1811) = *Othonna integrifolia* L. Sp. Pl. 925 (1753).

230. ARCTIUM LAPPA L. Sp. Pl. 816 (1753). We consider that the Linnean name should be retained for *A. majus* Bernhardi, Syst. Verz. Erf. 154 (1800).

237. ARNOSERIS MINIMA Link, Enum. Hort. Berol. ii. 294 (1822) = *Hyoseris minima* L. Sp. Pl. 809 (1753).

240. THRINCIA NUDICAULIS Britten in Journ. Bot. xlv. 33 (1907) = *Crepis nudicaulis* L. Sp. Pl. 805 (1753), *Leontodon hirtum* L. Sp. Pl. ed. 2, 1123 (1763).

236*. HELMINTIA. This is the spelling given by Jussieu when instituting the genus (Gen. Pl. 170, 1789).

241. CREPIS CAPILLARIS Wallroth, Fl. Hercyn. 287 (1840). There seems no reason for doubting that this is a synonym of *Lapsana capillaris* L. Sp. Pl. 812, which Linnæus later (Sp. Pl. ed. 2, 1134) called *Crepis virens*. Wallroth's name has been very generally lost sight of; we regard it as a small form of *C. poly-*

morpha Wallr. *l. c.*, which is generally accepted as a synonym of *C. virens*.

247. Legousia. This genus must be retained on grounds of priority; it was published by Durande, Fl. Bourgogne, i. 37 (1782). *Specularia* A. DC. dates from 1830 (Monogr. Campan. 344).

248. Wahlenbergia Schrad. (1814) is retained instead of *Cervicina* Delile (1813) in accordance with the Vienna Code.

254. Bryanthus cœruleus Dippel, Handb. Laubholzk. i. 385 (1889) = *Andromeda cærulea* L. Sp. Pl. 393 (1753).

255. Daboecia cantabrica comb. nov. This was first described as *Vaccinium cantabricum* Hudson, Fl. Angl. 143 (1762).

259. Moneses uniflora A. Gray, Man. Bot. 273 (1848) = *Pyrola uniflora* L. Sp. Pl. 397 (1753).

276. Centaurion Adans. Fam. ii. 502 (1763). There seems no reason for rejecting this name. Adanson gives a diagnosis, and cites *Gentiana Centaurium* L.

C. umbellatum Gilib. Fl. Lituan. i. 35 (1781) = *Gentiana Centaurium* L. Sp. Pl. 229 (1753).

C. vulgare Rafn. Danm. Fl. ii. 73 (1800) is a synonym of *Chironia littoralis* Turner in Bot. Guide, 469 (1805).

279. Nymphoides Hill, Brit. Herbal, 77 (1756). This is the earliest name for the genus. Linnæus, Sp. Pl. 145, called the plant *Menyanthes nymphoides*; the earliest available trivial is *peltatum*—*L. peltatum* Gmelin, Nov. Comm. Acad. Petrop. xiv. 527 (1770).

294. Myosotis pyrenaica Pourret in Mém. Acad. Toul. iii. 322 (1788). Pourret's name takes precedence of *M. alpestris* F. W. Schmidt, Fl. Boëm. iii. 26 (1794). Pourret refers to Haller no. 591 (Hist. Stirp. Helvet. i. 261, 1768), but clearly means 592, which is this plant.

313. Lasiopera. This genus, established by Hoffmansegg and Link (Fl. Portug. i. 298, 1809), included four species, three of which are referred to other genera; we retain the name for the remaining species. *Lasiopera* antedates *Eufragia* Griseb. Spicil. Fl. Rumel. ii. 13 (1844).

317. Veronica Anagallis-aquatica L. Sp. Pl. 12 (1753). We restore Linnæus's name.

327. Nepeta hederacea Trevisan, Fl. Eugan. 26 (1842) = *Glecoma hederacea* L. Sp. Pl. 578 (1753).

329. Lamium moluccellifolium Fries, Nov. Fl. Suec. 72 (1819), antedates *L. intermedium* Fries, which he substituted for it later in the same work, p. 105 (1823).

331. Stachys officinalis Franchet, Fl. Loir-et-Cher 483 (1885) = *Betonica officinalis* L. Sp. Pl. 573 (1753).

337. Limonium binervosum C. E. Salmon in Journ. Bot. xlv. 24 (1907):—

Statice binervosa G. E. Sm. in Engl. Bot. Suppl. 2663 (1831).

S. occidentalis Lloyd, Fl. Loire-Inf. 212 (1844).
L. occidentale O. Kuntze, Rev. Gen. ii. 395 (1881).

340. LITTORELLA UNIFLORA Ascherson, Fl. Brandenb. 544 (1864) = *Plantago uniflora* L. Sp. Pl. 115 (1753).

346. CHENOPODIUM SEROTINUM L. Cent. Pl. ii. 12 (1756) = *C. ficifolium* Sm. Fl. Brit. i. 276 (1800). Linnæus gives it as an English plant and cites as a synonym *Blitum ficus folio* of Ray's Synops. ed. 3, 155, and later includes it in his *Flora Anglica* (Amœn. Acad. iv. 98).

348. SALICORNIA EUROPÆA L. Sp. Pl. 3 (1753). *S. europæa* L. included two plants named *herbacea* and *fruticosa*. These are raised to specific rank in Sp. Pl. ed. 2, 5, where the name *europæa* disappears. We have retained it for the former plant.

353. POLYGONUM MACULATUM Babington, Man. ed. 7, 301 (1874). This is generally cited as of Trimen and Dyer (Journ. Bot. ix. 36, 1871), but occurs there only as a subspecies of *P. lapathifolium* L.

P. ROBERTI Loiseleur, Nouv. Not. 17 (1827). We follow Nyman (Consp. Fl. Europ. 638) in restoring this name as the earliest for the species.

363. CALLITRICHE PALUSTRIS L. Sp. Pl. 969 (1753). We have retained Linnæus's name for the first part of his original species, which is cited for *C. verna* in Fl. Suec. ed. 2, 2 (1755).

378. JUNIPERUS SIBIRICA Burgsdorf, Anleit. ii. 124 (1787). This is an earlier name for *J. nana* of Willdenow, who cites it as a synonym. It has until recently been overlooked, but Prof. Sargent (Silva N. Amer. x. 76, 1896) and Koch (Dendrologie, ii. pl. 2, 116, 1873) accept it.

385. WOLFFIA ARRHIZA Wimmer, Fl. Schles. ed. 3, 140 (1857) = *Lemna arrhiza* L. Mant. 294 (1771).

386. POTAMOGETON COMPRESSUS L. Sp. Pl. 127 (1753). We follow Ascherson & Graebner (Syn. Mitteleur. Fl. i. 339, 1897) in taking this name for *P. zosterifolius* Schum.

P. LONGIFOLIUS Babington was based on a single plant of very doubtful affinity; see Journ. Bot. 1894, 204. It is therefore excluded.

404. HABENARIA MONTANA Durand & Schinz, Consp. Fl. Afr. v. 82, 1892. We have retained the earliest specific name; the species was first described as *Orchis montana* Schmidt, Fl. Boëm. i. 35 (1793).

405. OPHRYS. We agree with authors in regarding *O. insectifera* L. Sp. Pl. 948 (1753) as including what is generally known as the insectiferous group, and as therefore untenable for any segregate. The first author to differentiate was Hudson (Fl. Angl. 340 (1762)) who separated *O. muscifera*, and *O. apifera* with a "var. β." In his second edition (p. 392, 1778) he raised this variety to specific rank as *O. aranifera*; but Miller (Gard. Dict. ed. 8, n. 8 (1768)) had already named this *O. sphegodes*. The English description of "the eighth sort" in this edition refers to n. 7—the Bee

Orchis—as is shown by reference to the previous edition in which that plant is numbered 8. *Arachnites* * was used by Linnæus as a varietal name including the Bee and Spider series of *O. insectifera*, and it was employed specifically by Lamarck (Fl. France, iii. 515 (1778)) in the same sense, and not in the restricted sense in which it is used by Smith and English botanists. Miller, l. c., restricted this to the "Common Humble Bee Orchis," which Hudson had already named *O. apifera*. In any case, however, this is anticipated by *Orchis fuciflora* Crantz (Stirp. Austr. 483 (1769)) whose description and citations leave no doubt as to his meaning. The synonymy of our British species of *Ophrys* is as follows :—

Ophrys muscifera Hudson, Fl. Anglica, 340 (1762).
O. insectifera Mill. Dict. ed. 8, n. 6 (1768).

Ophrys fuciflora Reichenb. Ic. Fl. Germ. xiii. 85 t. 109 (1851).
Orchis fuciflora Crantz, Stirp. Austr. 483 (1769).
Ophrys Arachnites Sm. Engl. Fl. iv. 273 (1828) et auct.

Ophrys apifera Huds. Fl. Angl. 340 (1762), excl. β.
O. Adrachnites Mill. Dict. ed. 8, n. 7 (1768).

Ophrys sphegodes Mill. Dict. ed. 8, n. 8 (1768).
O. apifera β Huds. Fl. Angl. 340 (1762).
O. aranifera Huds. Fl. Angl. ed. 2, 392 (1778).

407. Goodyera Br. The earlier name *Peramium* Salisb. is not available, as Salisbury did not characterize the genus.

411. Epipactis and 412. Cephalanthera. Linnæus, Sp. Pl. 949 (1753), includes under *Serapias Helleborine* the species of *Epipactis* and *Cephalanthera*. In ed. 2 (p. 1344, 1763) he restricts *Helleborine* to the species known as *Epipactis latifolia* in a broad sense, for which we have retained the original name, following Crantz, Stirp. Austr. ed. 2, 467 (1769). In the same work (p. 1346) Linnæus separates as *S. longifolia* the white-flowered species of *Cephalanthera* and *Epipactis palustris*. In Syst. Nat. xii. 593 (1767) he retains *S. longifolia* for *Epipactis palustris*, as is evident from the description and the references to Scopoli, Fl. Carn. 256 (an excellent description), &c. ; we therefore, following Allioni, Fl. Pedemont. ii. 152 (1785), retain the name for *E. palustris*. At the same time Linnæus separates the white-flowered Cephalantheras as *Serapias grandiflora*. Scopoli, Fl. Carniolica, ed. ii. 203 (1772) restricts *S. grandiflora* (= *Epipactis alba* Crantz, *Cephalanthera pallens* Auct.), and separates (p. 202) as *S. longifolia* the *C. ensifolia* Auct.

414. Corallorrhiza Neottia Scopoli (*Neotia*), Fl. Carn. ed. 2,

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* The name is printed *Adrachnites* and appears in this form in Miller, Gard. Dict. ed. 8, no. 7, whence it is taken up by Dr. Schinz (Bull. Herb. Boiss. 1907, 108) for *O. fuciflora*. *Adrachnites* was however clearly a blunder on the part of Linnæus ; he gives as a synonym "Orchis adrachnitis Lob. ic. 135," but a reference to Lobel shows that Linnæus misquoted both the name, which stands as "andrachnitis," and the page, which is 185. In his note on *O. insectifera* (l. c.) Linnæus writes *arachnites*, and the name appears in that form in his Flora Anglica, 23 (1754).

ii. 207 (1772) = *Ophrys Corallorhiza* L. Sp. Pl. 945; *Corallorrhiza innata* Br. in Ait. Hort. Kew. ed. 2, v. 209 (1813).

422. Crocus officinalis Hudson, Fl. Angl. ed. 2, 13 (1778). *C. vernus* Miller, Gard. Dict. ed. 8, no. 3 (1768), is the yellow-flowered *C. aureus* which is figured as *vernus* in Bot. Mag. t. 45 (1788). Hence another name must be found for *C. vernus* Allioni (Fl. Pedem. i. 84, 1785) and Auct. *C. sativus* L. Sp. Pl. 36, included two varieties, *officinalis* and *vernus*. Hudson changed the name to *C. officinalis* with varieties *sativus* and *sylvestris*. *C. sativus* is by common consent restricted to the Saffron Crocus, hence *C. officinalis* remains for the plant indicated by Linnæus as var. *vernus* and by Hudson as var. *sylvestris*.

431. Maianthemum bifolium DC. Fl. France, iii. 177 (1805)= *Convallaria bifolia* L. Sp. Pl. 316 (1753).

441. Simethis planifolia Grenier & Godron, Fl. France, iii. 222 (1855) = *Anthericum planifolium* L. Mant. 224 (1771). *Pubilaria* Raf., the earlier name for the genus, is excluded by the Code.

442. Endymion non-scriptum Garcke, Fl. Deutschl. 322 (1849) = *Hyacinthus non-scriptus* L. Sp. Pl. 316 (1753).

447. Juncus mutabilis Lamarck, Encycl. iii. 270 (1789). We consider this must be retained for *J. pygmæus* Rich. in Thuill. Fl. Paris, ed. 2, 178 (1799).

449. Eriocaulon articulatum Morong in Bull. Torr. Bot. Club, xviii. 353 (1891). We have restored the earliest specific name, the first publication of the plant being by Hudson, Fl. Angl. ed. 2, 414 (1778), as *Nasmythia articulata*.

455. Scirpus nanus Sprengel, Pugill. 4 (1813). There seems no reason to doubt the identity of this with the later *S. parvulus* Roem. & Schult. Syst. ii. 124 (1817). *S. nanus* Poir. (1804) is referred to *Fimbristylis argentea* Vahl.

S. filiformis Savi, Fl. Pisan. i. 46 (1798). This name antedates *S. cernuus* Vahl, Enum. ii. 245 (1806) and *S. Savii* Seb. & Maur. Fl. Rom. Prodr. 22 (1808). *S. filiformis* Lam. Illustr. i. 138 has been referred to *Eleocharis tenuis* Schult.

457. Eriophorum paniculatum Druce in Ann. Scott. Nat. Hist. 1906, 227. This change is rendered necessary by the restoration of the earliest trivial name. *Linagrostis paniculata* Lam. Fl. France, iii. 555 (1778) antedates *E. latifolium* Hoppe, Taschenb. 1800, p. 108.

458. Kobresia bipartita Dalla Torre, Anleit. Alpenfl. 216 (1882) = *Carex bipartita* Allioni, Fl. Pedem. ii. 265 (1785); *K. caricina* Willd. Sp. Pl. iv. 206 (1805).

459. Carex diandra Schrank, Cent. Bot. Anmerk. 57 [49] (1781) = *C. teretiuscula* Good. in Trans. Linn. Soc. ii. 163 (1794):

C. Lachenalii Schkuhr, Riedgr. i. 51 (1801) = *C. lagopina* Wahlenb. in Vet. Akad. Handl. Stockh. 1803, 145:

C. Halleri Gunnerus, Fl. Norveg. ii. 106 (1772) = *C. alpina* Sw. in Liljeb. Utk. ed. 2, 26 (1798).

C. caryophyllea Latourrette, Chlor. Lugd. 27 (1785). We

follow Ascherson and Graebner in retaining this name for *C. præcox* Jacq. Fl. Austr. v. 23 (1778), non Schreb. Spicil. 63 (1771); *C. verna* Chaix in Vill. Pl. Dauph. ii. 312 (1786).

C. HELODES Link in Schrad. Journ. Bot. ii. 309 (1799). Notwithstanding the character "spicæ masculæ 1–3 terminales," the evidence of contemporary and later botanists points to the identity of this with *C. lævigata* Sm. in Trans. Linn. Soc. v. 272 (1800), though Smith himself nowhere cites it as a synonym. Kunth, however (Enum. ii. 493), cites as a synonym of *C. lævigata*, "*C. helodes* Link (*fide* Smith)." Ascherson and Graebner, Syn. Mitteleurop. Fl. ii. 182, also regard the names as synonymous.

460. DIGITARIA LINEARIS Crépin, Fl. Belg. ed. 2, 335 (1866) = *Panicum lineare* Krocker, Fl. Siles. i. 95 (1787)—the earliest specific name for *D. humifusa* Pers. Syn. i. 85 (1805).

464. MIBORA MINIMA Desvaux, Obs. Pl. Angers, 45 (1818) = *Agrostis minima* L. Sp. Pl. 63 (1753).

467. HIEROCHLOE ODORATA Wahlenb. Fl. Upsal. 32 (1820) = *Holcus odoratus* L. Sp. Pl. 1048 (1753).

468. PHLEUM PHLEOIDES Simonkai, Fl. Transsilv. 563 (1886) = *Phalaris phleoides* L. Sp. Pl. 55 (1753).

475. AMMOPHILLA ARENARIA Link, Hort. Berol. i. 105 (1827) = *Arundo arenaria* L. Sp. Pl. 82 (1753).

478. AGROSTIS TENUIS Sibthorp, Fl. Oxon. 36 (1794) = *A. vulgaris* With. Arr. ed. 2, iii. 132 (1796).

486. ARRHENATHERUM ELATIUS Mertens & Koch, Deutschl. Fl. i. 546 (1823) = *Avena elatior* L. Sp. Pl. 79 (1753).

491. POA. In view of the close relation of *Poa minor* Gaud. (*P. flexuosa* Sm.) and *P. laxa* Haenke to *P. alpina* L. we have retained only the last-named; *P. Parnelli* Bab. and *P. Balfouri* Parn. are similarly related to *P. nemoralis* L.

493. SCLEROCHLOA FESTUCIFORMIS comb. nov. = *Glyceria festuciformis* Heynh. ex Reichenb. Fl. Excurs. i. 45 (1830) (*Poa festuciformis* Host, Gram. Austr. iii. 12 (1805)). This plant was not previously included under *Sclerochloa*.

S. RUPESTRIS comb. nov. The earliest name for this species seems to be *Poa rupestris* With. Arr. ed. 3, ii. 146, t. 26 (an excellent figure) (1796), which almost certainly antedates *Poa procumbens* Curtis, Fl. Lond. fasc. vi. t. 11, the date of which is unknown, but probably later, as Withering, who cites plates from other numbers in the same fascicle, does not refer to this.

498. FESTUCA FASCICULATA Forskål, Fl. Ægypt.-Arab. 22 (1775). There seems no doubt that this is identical with *F. uniglumis* Sol. in Ait. Hort. Kew. i. 108 (1789). *Stipa membranacea* L. Sp. Pl. 560 (1753), which has been suggested as a synonym, is altogether doubtful; for full discussion of the question see Duval-Jouve in Rev. Sci. Nat. Sér. 2, ii. 32–5 (1880).

F. BROMOIDES L. Sp. Pl. 75 (1753). We restore this name for

F. sciuroides Roth, Catalect. Bot. i. 11 (1800); Linnæus's references to Ray and Plukenet indicate the plant in question.

502. TRITICUM BIFLORUM Brignoli, Fasc. Pl. Forojul. 18 (1810). We follow Mitten, who first described Don's plant (Hook. Lond. Journ. Bot. vii. 533 (1848)), in referring it to this species. We have compared a specimen from Don with plants from Brignoli's classic locality.

504. HORDEUM EUROPÆUM Allioni, Fl. Pedemont. ii. 260 (1785) = *Elymus europæus* L. Mant. 35 (1767); *H. sylvaticum* Hudson, Fl. Angl. ed. 2, 57 (1778).

H. NODOSUM L. Sp. Pl. ed. 2, 126 (1762). Ray's plant cited by Linnæus was evidently a monstrosity, but the identity of *H. nodosum* with *H. pratense* Huds. Fl. Angl. ed. 2, 56 (1778), is established by the Linnean Herbarium.

516. POLYPODIUM MOLLE Allioni, Fl. Pedem. ii. 287 (1785), is an earlier name for *P. alpestre* Hoppe ex Sprengel, Syst. iv. 2, 320 (1827).

517. WOODSIA ALPINA S. F. Gray, Nat. Arr. ii. 17 (1821) :—
Acrostichum alpinum Bolton, Fil. Brit. 76 (1790).
A. hyperboreum Liljeblad in Vet. Acad. Nya Handl. Stockh. 1793, 201.
Woodsia hyperborea Br. in Trans. Linn. Soc. xi. 173 (1813).

518. LASTREA MONTANA T. Moore, Handb. Brit. Ferns, ed. 2, 100 (1853) :—
Polypodium montanum Vogler, Dissert. (1781).
P. oreopteris Ehrhart, Beitr. v. 44 (1789).

L. ARISTATA comb. nov. The earliest name for *L. dilatata* Presl, Tent. 77 (1836) is *Polypodium aristatum* Villars, Hist. Pl. Dauph. iii. 845 (1789).

529. HYMENOPHYLLUM PELTATUM Desvaux, Prodr. 333 (1827). This is the earliest trivial for *H. Wilsoni* Hook. Brit. Fl. 446 (1830), which was first described as *Trichomanes peltatum* Poiret, Encycl. viii. 76 (1808), and for which Hooker himself (Sp. Fil. i. 96 (1846)) cites it as a synonym.

HIERACIUM NOTES.

By Rev. AUGUSTIN LEY, M.A.

THE detection in Britain of more than one well-marked form of this genus hitherto undescribed may perhaps legitimately be used as an opportunity of describing a few Scandinavian forms also recently detected in this country. In compiling this paper, the writer wishes to acknowledge continual help and kind encouragement received from Rev. W. R. Linton, M.A., without which it would have been impossible for him to have undertaken it.

Records, unless otherwise stated, are on the authority of the writer.

Group Oreadea.

Hieracium britannicum F. J. Hanb. var. nov. ovale. Differs from the type in having the leaves less firm in texture, large, regularly oval from a truncate or shortly cuneate base, obtuse, their margin shallowly and evenly repand-dentate. The leaf-hair is partly setose, and the receptacle exhibits a few cilia on the margins of the dentate pits.

Brecon: Craig Cille, first in 1894; Cefn Coed, *H. J. Riddelsdell*! in both instances on limestone. West Yorkshire: Moughton Scaurs, Ingleborough, 1901; Smearsett Scaurs, Settle, 1901.

Group Sub-vulgata.

H. ciliatum Almq. var. nov. venosum. Differs from the cognate variety *repandum* Ley by the root-leaves being larger, deep green, broadly ovate-acute, from a truncate or subcordate often coarsely dentate base, with the veins strongly impressed; by the ligules being densely and longly ciliate-tipped; and by the receptacle-teeth bearing cilia. Stalked glands are occasionally present on the petioles.

West Brecon: abundant on Craig-y-Nos Ridge, at about 1700 ft. (limestone). First noticed in 1899; cultivated since that date.

H. serratifrons Almq. var. nov. Cinderella. Aspect and height of var. *lepistoides* K. Johanns., which it closely resembles in its root-leaves. The following characters separate it from that plant:—Stem-leaf well developed, ovate-lanceolate, often deeply toothed at the truncate base. Peduncles long; phyllaries long, narrowly subulate, senescent, very glandular; floccose on the surface, and very floccose-edged. Heads narrow, light grey to brown, never black; small, normally cuneate-based. Ligule rather densely ciliate-tipped. Style livescent.

Banks and woods; June.

Distribution. West Gloucester: Symond's Yat, 1905. Near Nailsworth, 1905, *Mrs. Foord Kelcey*! Hereford: Penyard Hill, near Ross, 1849, *Herb. E. Forster, Mus. Brit.*! Cowleigh Park in the east, 1905; Shobdon Hill Wood in the north, 1902; Whitfield in the west, 1905. Worcester: Wyre Forest, 1903. Salop: Benthall Edge, 1895; Much Wenlock, 1902, *W. H. Painter*! Glamorgan: Ysgwd-gwladys, 1905, *Riddelsdell*! Lisvane, Rudry, and other places near Caerphilly, 1905, *Riddelsdell & Ley*. Montgomery: Craig Breidden, 1901.

Group Eu-vulgata.

In this section several forms described by Scandinavian botanists having been recently recognized as British, it becomes desirable, before giving a short description of these, to insert in this paper a part of the scheme in which they are placed by Aman. H. Dahlstedt:—

A. Hairs more abundant than, or equalling glands. Phyllaries ± floccose, especially on their margins.
I. Glands ± dense.
(*a*) Hairs fairly dense, phyllaries fairly floccose.
1. *H. acroleucum* Stenst.
2. *H. vulgatum* Fr.
(*b*) Phyllaries ± densely glandular, efloccose, with hairs scattered to dense.
3. *H. pinnatifidum* Lönnr. var. *vivarium* Lönnr.
II. Glands scattered or few.
4. *H. sub-ramosum* Lönnr.
B. Hairs fewer than the glands, or in some cases 0. Phyllaries floccose-margined.
5. *H. conspersum* Dahlst.
6. *H. scanicum* Dahlst.
7. *H. irriguum* Fr.
[*H. sciaphilum* Uechtr.]
C. Phyllaries efloccose or rarely floccose-margined, densely glandular.
I. Styles dull.
(*a*) Leaves slightly hairy.
8. *H. anfractum* Fr. Subsp. *cacuminatum* Dahlst. var. *barbareæfolium* Lönnr.
(*b*) Leaves more or less densely pilose.
9. *H. diaphanoides* Lindeb.
10. *H. ornatum* Dahlst.
II. Styles yellow.
11. *H. diaphanum* Fr. var. *glaucovirens* Dahlst.

H. PINNATIFIDUM Lönnr. Dahlst. C. ii. (1892) No. 86. *H. vulgatum* Fr. var. *nemorosum* Lindeb. fasc. ii. No. 74. Stem tall, flexuose, violascent and pilose below, slightly pilose and with stellate pubescence above. Root-leaves 3–4, the outer withering early, oval, with short teeth or sub-entire, inner oval-oblong to lanceolate, innermost acute, with many short teeth or pinnate-dentate. Stem-leaves distant, the lower often large, ovate-lanceolate to lanceolate, long-pointed, pinnatifid-dentate especially at the base, often laciniate or many of the leaves slightly dentate, all violascent beneath, pilose, and with stellate pubescence. Panicle ample, lower branches remote upper approximate, long, exceeding acladium. Peduncles white-floccose with many dusky hairs and few scattered glands. Involucre somewhat slender, rounded at base. Phyllaries linear-lanceolate, inner green-margined, with long naked points, slightly floccose at base, with fairly numerous black glands and somewhat fewer hairs. Styles yellowish or dingy.

Distribution. Carnarvon: Bangor, *Griffith*, 1892! abundant in woods in the Ogwen Valley, 1904. Denbigh: Colwyn, *Painter*, 1895! Derby: Dove Dale, *W. R. Linton*, 1896! Leicester, *Bell*, 1896! Bridge of Brown, Easterness, 1905, *Marshall*! Craig Caillich, Perth, 1891, *W. R. Linton*!

Var. *vivarium* Lönnr. Dalhst. C. ii. (1892), No. 87. Differs from the type by a more rigid habit, shorter leaves with fewer and

more regular teeth, rather broader phyllaries with more numerous and more robust glands.

Herefordshire: Lyonshall, 1891; Pembridge, 1902. Carnarvon: near Bangor, 1891.

H. CONSPERSUM Dahlst. C. xi. (1899), No. 76. *H. flocculosum* Dahlst. Bidrag. til Syd. Sver. Hier. iii. (under *H. gothicum* Fr.), 178; Hierac. Exsicc. iii. No. 53. Stem 16–30 inches high, glabrous. Basal leaves 1–3, often disappearing before flowering, slightly toothed, inner *acute*; stem-leaves 4–6, *narrow* cuspidate *acute* with subulate teeth. Panicle nearly simple or branched. Peduncles finely tomentose, nearly epilose and eglandular. Heads rather large, dark green, with base rounded at first then truncate. Phyllaries lanceolate epilose sparingly floccose senescent glandular with many dark glands. Ligule glabrous. Style dark.

Near Coniston, Lake Lancashire, 1905, *W. R. Linton*!

H. SCANICUM Dahlst. Bidrag. iii. (under *H. pinnatifidum* Lönnr.), 89; Exsicc. ii. Nos. 73, 74, and 75. "Very near *H. irriguum* Fr., from which it differs (as described *loc. cit.*) in the long white hairs of the stem, the broader oval sub-entire or less toothed leaves, the rather thicker heads, narrower phyllaries, and styles more nearly pure yellow. It can scarcely be held as anything more than a slight variety of *H. irriguum* Fr."—*W. R. Linton*.

Distribution general. North Devon, North Hants, Surrey, West Gloucester, Monmouth, Hereford, Glamorgan, Brecon, Radnor, Denbigh, Merioneth, Carnarvon, Derby, Stafford, West Yorks.

H. ANFRACTUM Fr. subsp. CACUMINATUM Dahlst. Bidrag iii. 151; C. XV. (1903), Nos. 57, 58. Stem tall robust softly pilose below, sparingly flocculose. Leaves dull green; basal oval to oval-elliptic with broad sharp teeth, inner ovate-elliptic to ovate-lanceolate, subulate-dentate or serrate, rapidly or gradually narrowing to long petioles. Stem-leaves 4–6, decreasing, lower petioled, ovate, ovate-lanceolate or lanceolate, subulate-dentate or serrate-dentate, pilose below, margin ciliate. Panicle contracted, with distant lower and approximate upper branches, all erect-patent. Peduncles short floccose, with slender scattered glands under the head. Heads rather broad, darkish green, truncate below. Phyllaries rather narrow linear-lanceolate subacute, sparingly flocculose especially on the margin, with rather numerous blackish slender glands. Ligules glabrous, styles dull.

British plants attributed to this species are abundant and generally distributed; a great deal of the material usually placed under *H. sciaphilum* Uechtr. being now placed under *H. cacuminatum* Dahlst. It must, however, be said that most of the English plants differ from Scandinavian types in having greyer heads, with much more numerous glands, and senescent phyllaries. The panicle also is often wide-spreading; but this is the case in some Scandinavian examples of *H. cacuminatum*. Plants very close to the foreign type occur near Bangor, Carnarvon (1899, 1904); also in Brecon and Hereford.

H. sciaphilum Uechtr. differs from *H. cacuminatum* Dahlst. in

its contracted panicle, often bracteolate peduncles, and always ciliate ligules. It is possible that the bulk of our British plants may stand between *H. cacuminatum* and *H. sciaphilum*.

Var. BARBAREÆFOLIUM (Lönnr.) Dahlst. Bidrag iii. 152, C. xii. (1900), No. 82; Exsicc. ii. No. 71, iv. No. 88. Differs from the type by its stem-leaves being narrower, lanceolate, ± sharply longly and unequally pinnatifid-dentate at base; by its broader efloccose phyllaries, with shorter stouter glands.

West Gloucester, 1905; exactly corresponding with the Scandinavian type! Hereford. Brecon, *W. R. Linton*, 1902! Glamorgan, *Riddelsdell*, 1901! Derby, *W. R. Linton*, 1893!

H. ORNATUM Dahlst. Bidrag iii. 167; Exsicc. ii. No. 81; Herb. Hier. Scand. ii. Nos. 69, 70. Stem 15–30 inches high, thick hairy floccose above. Leaves ± dark-spotted; root-leaves oval-oblong to broadly lanceolate, much toothed with the teeth sharp, hairy on both sides, shaggy beneath and on the narrowly winged petioles. Stem-leaves 3–5, ovate-lanceolate to broadly lanceolate, sharply and unequally serrate-dentate below, often subulate-dentate above, acute, hairy. Peduncles white tomentose, glandular; panicle often umbellate-branched, with arcuate branches exceeding the acladium. Heads dark, rather elongate; phyllaries rather broad, obtuse except the innermost, very floccose-edged, senescent, with numerous long and short glands; style very dark.

Hills above Bethesda, Carnarvon, *W. R. Linton*. "A form approaching *H. ornatum*," Dahlstedt, *in litt.*

"HUCKLEBERRY" AS AN ENGLISH PLANT-NAME.

In the article on the Botany of Buckinghamshire which recently appeared in the "Victoria" history of the county, I used the above name to designate *Vaccinium Myrtillus*, as it is one which I have heard used in that county for half a century. The employment of the word as an English plant-name having been challenged, it may be well to give reasons to support its use in the above work. In *The New English Dictionary* Dr. Murray gives no British reference for the word, but cites several from North American sources, the earliest being that from D. Denton's *Description of New York* (1670)—"The Fruits natural to the Island are Mulberries, Posimmons, Grapes great and small, Huckelberries." In 1751 J. Bartram, the correspondent of Dillenius, writes (*Obs. Trav. Pennsylv.* p. 13): "The land hereabouts is middling white oak and huckleberry land."

Hitherto—with the exception of Prior, who is not a reliable authority (*Popular Names of British Plants*, ed. 3, p. 123), who says: "Hurtle-berry, Huckleberry, corruption of Whortle-berry, itself a corruption of Myrtle-berry"—no other author has used the name for our British plant.

The area where the name Huckleberry is used to designate *Vaccinium Myrtillus* is that portion of heathy country which is

situated on the Lower Greensand formation near Woburn, which extends into the counties of Beds and Bucks. My recollections go back to the early fifties, when I used to visit some relations I had in that neighbourhood, and one of my earliest memories is hearing of the adders which used to be such a source of apprehension to those going huckleberrying in Woburn woods, as related to me by my grandmother as one of the events of her early childhood. This carries back the use of the name for at least a century. Gipsies used to bring the berries round to the neighbouring villages for sale under the name of huckleberries. I have also heard my relative the late Mr. Smith, of Woolston, the well-known writer to *The Times* in the fifties on agricultural matters, refer nearly fifty years ago to the huckleberries in Brickhilll woods. Living people in the neighbourhood who are now over eighty years of age tell me that they have never heard any other name. Miss Flora Russell wrote to her cousin the Rev. Henry Russell, who knows the district intimately, and he replied, "Yes, huckleberries was always the local name of bilberries in the Woburn district. Emigrants went from there to America and settled in Massachusetts, where there is now a flourishing little town called Woburn, much frequented by wealthy Bostonians." The Duke of Bedford also kindly had inquiries made, and Mr. R. E. Prothero wrote in reply: "As to the local use of the word 'Huckleberry' for the fruit generally known as Whortleberry, I thought the best plan would be to have the applications for leave to pick them analysed. The result is that, out of one hundred and ten applications, one hundred and nine were for leave to pick 'huckleberries,' and the one appplicant who used the word 'Whortleberry' was not a native of the district. Two old women, (seventy-five and seventy-three) have also been asked as to the use of the word, and both reply that they have never known the fruit called by any other name than 'Huckleberry.' It may be of interest to you to be reminded that Bedfordshire contributed largely to the number of early settlers in the United States; Washingtons came from the Northants border, and the stars and stripes are the arms of their ancestors. Emerson's family came from Odell, and in the State of Massachusetts there is a Woburn—also a Bedford and a New Bedford—place-names given by the early settlers." In answer to my inquiry Mr. A. H. Linscott, the Mayor of Woburn, Mass., U.S.A., writes: "Huckleberries are very common in this locality. They have always been found here, and grow in great abundance. The bushes are low and spreading, the berries very dark." I therefore venture to contend that "Huckleberry" is a genuine British name for *V. Myrtillus*; that it has for a very lengthy period been used over a small area of the Midlands to distinguish it; and that, instead of being an American corruption of the word whortleberry, it was conveyed by the early English settlers to America, and transferred by them to other species having a superficial resemblance. Naturally, as the settlers spread over the country, the name became a generic one. Religious difficulties led to a large migration from Bucks and Beds, historically a home of the Puritans; Penn—a well-known Buckinghamshire name

—founded Pennsylvania. The distribution of *V. Myrtillus* in the Midlands is very restricted. We have no definite record of the species in Northants; it is absent from Cambridge and Hunts; in North Oxfordshire a small heathy tract on the glacial drift is said to have yielded a plant or two; and there are only two other localities on the Chilterns in the south of the county, where it is very scarce. In North Berkshire, Bagley Wood is the only locality; with the exception of the Brickhill district there are no other localities in North Bucks. The Brickhill and Woburn area is therefore practically an outlier, and shut off from the other English localities by considerable distances, which may have restricted the use of the common name. It may be borne in mind that the word "huckle" is widely spread in the Upper Thames and Ouse district for a joint. The "huckle-bone" of a sheep is or was often kept in the pocket as a prophylactic for rheumatism. This name is cited in Wright's *English Dialect Dictionary*, iii. 264, in the same sense, and "huckle-back" is used for a bent back. I venture to ask if the jointed appearance of the stems may not have suggested the name, rather than the corruption from whorts or whortleberry.

G. Claridge Druce.

When I called Mr. Druce's attention to his unfamiliar use of Huckleberry, I had no expectation of eliciting so interesting a note as the above. Instances of a name confined to a limited area are not unknown, but in the present instance the matter is complicated by its general use in the United States. It may be hoped that some American botanist will throw further light on the matter, and it would be of interest to find some derivation of the word more probable than that suggested by Mr. Druce, which I do not think can be maintained. The name does not appear in our *Dictionary of English Plant-Names*, nor in the numerous MS. additions thereto.

James Britten.

NOTES ON SOME TROPICAL AFRICAN RUBIACEÆ.

By Spencer le M. Moore, B.Sc., F.L.S.

In the lately issued part of Engler's *Botanische Jahrbücher* (vol. xxxix. pp. 516–571) appears a memoir by Dr. K. Krause, wherein are described a number of *Rubiaceæ* from Tropical Africa. Dr. Krause's descriptions are in every way admirable, and he bids fair worthily to fill the void left by the premature decease of Dr. Karl Schumann, an author among whose numerous contributions to systematic botany those on *Rubiaceæ* are by no means the least important. Dr. Krause, however, has had the misfortune—one to which all are liable now that bibliography has become so extensive—of overlooking work already published, namely, mine on Mr. T. Kässner's plants in this Journal for 1905 (pp. 249–251 and 350–3), and also the memoir in the *Journal of the Linnean Society*, vol. xxxvii. pp. 298 *sqq*. This necessitates alteration in a few of his names; while directing attention to this, the opportunity is taken

of noticing a few oversights which have crept into the memoir in question. The citations are given in order.

Oldenlandia pedunculata K. Schum. & K. Krause has already been described as *O. prolixipes* S. Moore (*l. c.*, p. 351).

O. Kaessneri K. Schum. & K. Krause. The locality for this is Sultan Hamoud (not "Hamond," as printed), and the number is given as 665. The only specimen of the genus from this place is referred by me (*l. c.* p. 350) to *O. Wiedemanni* K. Schum., *ex descriptione*, and as this specimen answers to Dr. Krause's description, and its number is 653, it is clear that there is an error in the citation of the number. I have examined the plant again, and still find it to agree with the description, though, as Dr. Krause has access to the type, he is better able to elucidate the point than I am. Perhaps he will kindly look into the matter again. In any event the name *O. Kaessneri* has already been used for *Kässner* 957 (*l. c.*, p. 249).

Randia congestiflora K. Krause is *R. micrantha* K. Schum. var. *Zenkeri* S. Moore in Journ. Linn. Soc. xxxvii. p. 304. The plant seems to me to be much more like *R. micrantha* than *R. sphærocoryne* K. Schum., with which Dr. Krause compares it.

Pentanisia crassifolia K. Krause. This I cannot think distinct from *P. sericocarpa* S. Moore. Dr. Krause gives as the points of difference between the two, the form, size, and texture of the leaves, and the length of the flowers. But the lower leaves of the single specimen of *P. sericocarpa* are almost exactly, judging from the description, as those of *P. crassifolia*, only a little smaller, while the upper ones are narrower indeed, though almost as long (the longest, I find, measure 3·5 cm.). As regards the texture of the leaf, that I unfortunately did not record; the leaves are distinctly fleshy. Then *P. crassifolia* is said to have corollas with a tube 1·0–1·3 cm. long., and my measurement for *P. sericocarpa* is 1·0 cm, Lastly, the lobes of the corolla of my species are 4·5 mm. in length. while those of Dr. Krause's are only 2·0–2·5 mm.; but it should be remembered that my measurement was taken from corollas expanded after thorough soaking, and, moreover, I find that *in the dry state* the lobes of corollas just opening measure only 2·5 mm. Both specimens were found at Salisbury, Rhodesia, by Dr. Rand and Professor Engler respectively.

Plectronia microterantha K. Schum. & K. Krause has already been described under the name of *Canthium pseudoverticillatum* (*l. c.* p. 352). It is founded on *Kässner* 383.

P. longistaminea K. Schum. & K. Krause is *C. Kaessneri* S. Moore (*l. c.* p. 351).

Coffea Engleri K. Krause. A figure is given of this; it is undoubtedly *Tricalysia jasminiflora* Benth. & Hook. f. Miss Gibbs, who found the plant in the same place, *viz.* the Matopos, where it is abundant, drew my attention to this oversight. I believe there is no *Coffea* native to the Matopos; at least Miss Gibbs, who botanized there with such success in 1905, did not come across one.

Pavetta lasiorhachis K. Schum. & K. Krause (*Zenker* 2259 and

3017) does not belong to *Pavetta*, as there are several ovules in each cell of the ovary. It is a species of *Tarenna* (or, as Dr. Krause, following Schumann, wonld call it, of *Chomelia*), and is very close to, and possibly identical with, *Zenker* 1343, distributed as *Chomelia conferta* var. *macrantha* K. Schum.

Psychotria albidocalyx K. Schum. var. *angustifolia* K. Schum. & K. Krause. This is founded on *Kässner* 307, and, as it agrees with a specimen at Kew sent from Berlin as *P. amboniana* K. Schum., was so named by me (*l. c.* p. 353). As regards Kässner 185, also referred my me (*l. c.*) to *P. amboniana*, I have since recorded my belief (in manuscript) that this specimen may belong to *P. albidocalyx* K. Schum., as it is similar to Kew specimens thus named.

[To the above note it may be added that in his interesting account of the plants of the Transvaal and Rhodesia observed during the journey of the British Association in 1905 (Sitz. K. Preuss. Akad. Wissensch. lii. 866–906) Prof. Engler makes no reference to any of the species described by Mr. Moore in several papers in this Journal during the last five years, and especially in the paper on Mr. Eyles's Rhodesian plants (Journ. Bot. 1905, 44–54). It is of course possible that Dr. Engler may have met with none of the numerous novelties described by Mr. Moore, but this seems hardly probable in view of the fact that the new species described by Mr. E. G. Baker in our pages from the same collections are frequently referred to. In view of future publication of plants from the same region, it seems desirable to call attention to these papers, especially as it is evident from Mr. Moore's remarks printed above that the danger lest work should be overlooked is by no means an imaginary one.

It is to be regretted that the Vienna Congress, when dealing with the question of quoting authorities for names, did not point out the desirability of something like uniformity in citation. It might be thought that such a recommendation was unnecessary, and that at least the same writer in the same paper (or at any rate in the same paragraph) would quote the same author in the same way, and would refrain from citing two authors in a precisely similar manner. That such an anticipation would not be justified is shown by Prof. Engler's paper. On p. 892, in the space of fifteen lines, he quotes Mr. E. G. Baker in four different ways: *Ekebergia arborea* "Baker," *Lessertia stipulata* "G. Baker," *Dolichos Welwitschii* var. *Randii* "G. Bak.," and *Triumfetta Mastersii* "Bak. f." Only the last of these can be correct; the more usual forms are "E. G. Baker" and "Baker fil.," which do not appear. This is bad enough, but a further complication arises in the citation of *Rhynchosia antennulifera* "G. Bak.," which in this instance means J. G. Baker! Mr. Spencer Moore enjoys perhaps a greater variety of citation; he tells us that he has seen himself referred to as Moore, Le Moore, Le M. Moore, S. Moore, Sp. Moore, Spenc. Moore, Spencer Moore, Spencer Le M. Moore, Spencer Le Marchant Moore, and P. Moore! But in this case the name gives scope for variety, and the citations extend over a wide range of time and place.—Ed. Journ. Bot.]

DOCTOR SARRASIN OF QUEBEC.

By M. L. Fernald.

In Dr. Macfarlane's interesting discussion (Journ. Bot. 1907, 1–4) of the origin of the generic name *Sarracenia*, he shows very clearly that the plant was named by Tournefort, not for Dr. Jean Antoine Saracen (or Sarracen), of Lyons, 1547–1598, as some writers have stated, but for a physician of Quebec, who lived more than a century later than Jean Antoine Saracen. In regard to this Quebec physician, Dr. Macfarlane leaves certain matters indefinite which he would have made clearer had he referred to a paper by Professor Penhallow,* in which the history of the Quebec physician was worked out in some detail.

According to Dr. Macfarlane, this man was "Dr. D. Sarrasin, physician, anatomist, and botanist of Quebec," and he "died at Quebec (about c. 1730–1740 ?)." The initial "D" of Dr. Sarrasin's given name may have been assumed by Dr. Macfarlane from Tournefort's dedicatory statement, "Sarracenam appellavi à Clarissimo D. *Sarrazin*" †; but, in view of the then current practice of using the abbreviation "D" for the title *Doctor*,‡ it is probable that it had no other significance in connection with Sarrasin's name. Many similar cases could be cited; for instance, Tournefort's statement in the publication of the genus *Garidella*, that "Garidella dicitur à Clariss. D. *Garidel*," whose name, according to Pritzel, was *Pierre Joseph*, not "D.," Garidel; or the frequent references to Dr. Richard Richardson quoted in this Journal only a few pages after Dr. Macfarlane's article from eighteenth century writers who constantly referred to him as "D. Richardson."

Professor Penhallow, whose notices of early Canadian botanists were based upon old manuscripts at Quebec and on other local records, found that "the earliest physician, whose name is prominently connected with the botany of this country [Canada], was Sarrasin, resident physician at the Court of Quebec, in the early part of the eighteenth century, a position he held until his death, in 1734, at the age of seventy-five years"; and in his chronological

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* D. P. Penhallow, "Review of Canadian Botany from the First Settlement of New France to the Nineteenth Century," part i. (Trans. Royal Soc. Can. v. sect iv. 1887, 45–61). [The same section contains a long "étude biographique" on Michel Sarrazin," by the Abbé Laflamme (pp. 1–23), who states that the name was spelt indifferently Sarrasin or Sarrazin, but thinks the latter the original spelling.—Ed. Journ. Bot.]

† Tourn. Inst. i. 657 (1700). The author of the article which suggested these notes says: "In 1719, Tournefort, ignoring the older names of *Coilophyllum*, *Bucanephoron*, *Bucanephyllon*, &c., applied by his predecessors, wrote, '*Sarracenam*,'" &c.; thus implying that the name *Sarracena* started in the *Institutiones* of 1719, which was the third edition, and issued eleven years after the death of Tournefort. Furthermore, at least one of the "older names applied by his predecessors," *Bucanephyllon*, was published by Plukenet in 1705, five years *after* Tournefort's original publication of *Sarracena*, which was cited by Plukenet.

‡ [But does it not rather mean *Dominus* ?—Ed. Journ. Bot.]

arrangement of Canadian botanists Professor Penhallow not only gives Sarrasin's full name, but the exact date of his death :—

"Sarrasin, Michel.—Born in 1659; died at Quebec, Sept. 9th, 1734. Physician at the Court of Quebec in 1730."

Thus it would appear that, instead of being named, as Dr. Macfarlane's discussion makes out, for a theoretical Dr. "D." Sarrasin, of Quebec, who died "about c. 1730–1740?" the genus *Sarracenia* (*Sarracena*) was dedicated by Tournefort to Dr. Michel Sarrasin, physician at the Court of Quebec, who was born in 1659, and died at Quebec, September 9th,* 1734.

Gray Herbarium of Harvard University.

BIBLIOGRAPHICAL NOTES.

XLII. — Plants of the Antilles.

In the admirable bibliography with which Dr. Urban has enriched the *Symbolæ Antillanæ*, I find no mention of a book recently acquired for the library of the New York Botanic Garden, as to whose authorship Anna M. Vail, the librarian, lately wrote to me. Miss Vail, having transcribed the title, added a description of the work, which I quote :—

"*Voyages to the Madeira and Leeward Caribbean Isles; with Sketches of the Natural History of these Islands.* By Maria R****** Edinburgh: Printed for Peter Hill and T. Cadell, London. 1792.

"It is a narrow 8vo, with 9 pages of preface and 105 pp. of text. The lady dedicates her little book to Mr. William Smellie, member of the Antiquarian and Royal Societies of Edinburgh. She travelled to the West Indies *viâ* Madeira in 1788, and describes a voyage to St. Christopher's in the same year, and a tour through Antigua and Barbuda in 1790, but her principal efforts are focused on a Geographical Description and Natural History of Antigua, 1791. The list of plants, pp. 81–105, would appear to be about the first flora of the island, as far as we have been able to discover here with the bibliographies that we have at our command."

I was unable to supply any information as to the authorship of the book, but Mr. S. F. Skan, of the Kew Herbarium, has been more fortunate. He points out to me that in Dryander's Catalogue of the Banksian library and in the British Museum Catalogue of Printed Books, from which it appears that another edition (? a reprint) of the book was published at Salem in 1802, the name is given as Riddell, and directs my attention to the following passage in the *Dictionary of National Biography* (xlviii. 272) under Robert Riddell, a patron of Robert Burns : "By 1792 Burns was on very friendly terms with Riddell's brother, Walter Riddell of Woodley

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* [He died on the 8th and was buried on the 9th; see Laflamme, l. c. 11.—Ed. Journ. Bot.]

Park, four miles south of Dumfries, who had married, in 1791, Maria Woodley, daughter of William Woodley, governor of St. Kitts and the Leeward Islands. The lady was only nineteen, but had a taste for literature, and was anxious to publish an account of her own voyages. Burns gave her a letter of introduction to a printer, and proceeded, according to his wont, to write love-songs about her. Early in 1794, at an entertainment held at Walter Riddell's house to celebrate his return from a voyage to the West Indies, Burns insulted his hostess. Burns's apology was rejected by the lady and her husband, and he attacked Mrs. Riddell in the 'Monody on a Lady famed for her Caprice,' and other verses. By 1795 the poet was again on friendly terms with Walter Riddell's wife. When Burns died in 1796 she published in the 'Dumfries Journal' an admirable article on her friend's character, a defence which reflects credit on both the writer and her subject." Mr. Skan adds that Maria Riddell edited *The Metrical Miscellany*, published in 1802.

JAMES BRITTEN.

SHORT NOTES.

NOTES FROM CORNWALL.—Mr. Hemsley's interesting observations (p. 60) on the Wild Cabbage growing between Fowey and Readymoney afford an opportunity for expressing suspicions that I have had about the origin of these plants since first examining them more than ten years ago. Their gigantic proportions, perennial character, and long, more or less pinnatifid leaves, all of which are foreign to genuine *Brassica oleracea*, have forced me to the conclusion that they originated from outcasts from some of the gardens that abut on the cliffs above. Along the cliffs at Polruan, just across Fowey Harbour, as well as at Looe, a few miles farther east, plants occur about whose indigeneity there can be no question; these are of much less stature, have short, rounded leaves, and are not nearly so long-lived. Four sheets of such specimens are now before me, on one of which the petals are nearly as large as those on the Walmer plants in H. C. Watson's Herbarium. If my suspicions about the Fowey plants are correct, it would appear to follow that the plate of *B. oleracea* in Eng. Bot. was prepared from a specimen of similar status, as the leaf there drawn is both long and pinnatifid. The occurrence of *Cotoneaster microphylla* Wall. by the side of Point Neptune Road, leading from Fowey to Menabilly, is easily explained. With *Erica vagans*, *E. mediterranea*, and several other ornamental species, it was planted there when the road was cut to cover and beautify the bare rocky sides. In several parts of the county, however, I have seen it flourishing on walls and hedge-banks, where it is certain it was never planted. The same observation applies to *Veronica angustifolia* A. Rich., *Leycesteria formosa* Wall., *Santolina Chamæcyparissus* Linn., &c. — F. HAMILTON DAVEY.

A Fumaria Hybrid.—Whilst botanizing with Mr. A. Wallis in June 1904, we noticed in a cultivated field near Wendover, Bucks, a fine growth of typical *F. densiflora* and *F. officinalis*. With these two species, plants were seen intermediate in character as regards bracts, &c., and, moreover, apparently quite barren. We could not resist forming the opinion that these might well be of hybrid origin, and Mr. Pugsley, who afterwards saw a dried example, was of the same mind. Mr. G. C. Druce (Fl. Berks, 38) says that he has not observed any intermediates between the two species where both grow together in Berkshire, but refers to the *Flora of Herefordshire*, where it is stated that forms of *F. officinalis* occur which are with difficulty kept apart from *F. densiflora* (p. 18). In another field, some miles away, near Pitstone Hill, *F. densiflora*, *F. officinalis*, *F. Vaillantii*, and *F. parviflora* flourished together, but no intermediates were noticed.—C. E. Salmon.

NOTICES OF BOOKS.

Haandbog i Norges Flora af Axel Blytt . . . udgivet ved Ove Dahl. Med 661 illustrationer. Alb. Cammermeyers Forlag. 8vo, pp. xi, 780. Kristiania. 1906.

This may be taken as a second condensed edition of the *Norges Flora* of M. N. & A. Blytt (1861–1877), which appeared in two parts, with an index and supplement in 1877, consisting of 1348 pages. In the present work of 780 pages the descriptions are much shortened, and also the distribution. The 661 illustrations, although only measuring about 3 in. × 2, are mostly excellent in catching the habit of the species, especially the ferns. The descriptions extend to about 1338 species and 186 subspecies. The classification is that of Engler and Prantl.

The author has consulted all the recent Scandinavian floras; the northern limit of species is given from that laborious work of Norman, the *Arktiske Flora*. The vexed question of nomenclature seems to have attracted attention, as many of the names of the *Norges Flora* of 1861 are changed. In many cases our British species are involved: e. g. *Hymenophyllum peltatum* Desv. = *H. tunbridgense*; *Hierochloe odorata* is so named in the text, but the drawing is called *H. borealis*; *Carex caryophyllea* Latourr. = *C. præcox* Jacq., *C. verna* Chaix. *Potentilla verna* L. contains two subspecies—*major* Wahlb. = *P. alpestris* Hall, and *minor* A. Blytt = *P. verna* Fr. & Gilib.; and so on. *Coleanthus subtilis* Roem. & Schult., which occurs on the dried-up sandy shores of large ponds in very dry seasons, may possibly occur in England, as was suggested many years ago by Dr. Trimen.

Of the critical genera, *Rubus* has 14 species with 4 subspecies; *Hieracium*, 83 species and 31 subspecies; *Salix*, 24 species and 2 subspecies, with 32 hybrids; *Carex*, 85 species, 12 subspecies, and 18 hybrids.

The book is compact, clearly and well printed and bound, with remarkably few corrections and additions. Without being too critical, it gives a very good idea of the Norwegian flora, and British botanists will find it well worth adding to their works of reference.

ARTHUR BENNETT.

Postelsia : the Year Book of the Minnesota Seaside Station. St. Paul, Minnesota. 1906. Pp. 364. 33 plates.

WE gather from Prof. Conway MacMillan's short introductory note that this is the second issue of a year-book by the Minnesota Seaside Station at Fort Renfrew on the Vancouver coast, the first year-book having been published four years ago. The present volume contains seven papers covering a wide range of subjects.

The principal novelty is to be found in a paper by Mr. R. F. Griggs, in which is established a new genus of Algæ—*Renfrewia*, closely allied to *Laminaria*. From the latter it is separated "because of its simple discoid holdfast without haptera, which, together with its small size and evident simplicity of structure, marks it as one of the most primitive of the kelps." The type is *R. parvula*, a new species, and with it are associated *R. solidungula* and *R. yezzoensis*, formerly known as *Laminaria solidungula* J. G. Agardh, and *L. yezzoensis* Miyabe. Miss Henkel's paper on Tide-pools is concerned more with geology than with botany. And Mr. Hall's paper on the Geological Features of the Station does not touch on botany. The Western Helvellineæ of Miss D. S. Hone are fungi which were collected in the western United States and Canada, and include four species of Geoglossaceæ, two of Helvellaceæ, and one of Rhizinaceæ. Mr. A. W. Evans, in treating of the Hepaticæ of Vancouver Island, gives a *résumé* of previous work done, to wit, Mitten's record of three species (1865), Pearson's of fifty-five species (1890), and Underwood's of sixty-six (1893). Mr. Evans has revised these older records, and, having received fresh material from Port Renfrew, is able to raise the total to seventy-one species, and he thinks that more may yet be found.

Mr. F. K. Butters contributes an interesting paper on the Conifers of Vancouver Island, giving a list of thirteen species which occur spontaneously on the island, and a table showing their distribution in the great coniferous forest of Western America from Alaska to California. He regards this great forest of the Pacific coast as being a survival from pre-glacial times. The relations of the species to local climatic conditions in Vancouver Island are considered. Full descriptions of all the native species are given, together with interesting notes on their distribution and habitat. Also a number of species which may be expected to occur in the mountains of Vancouver are briefly described. The author appends a useful key to the genera of conifers found in North-western North America, basing it upon the foliage of the mature plants; and also supplies in a tabulated form a comparative statement of seventeen main characteristics which in varying combinations distinguish respectively the five sections of the genus *Abies*.

Mr. C. O. Rosendahl publishes the results of his Observations on Plant Distribution in Renfrew District of Vancouver Island, his object being to set forth a few main facts bearing upon plant ecology and plant floristics without unnecessary details. He treats his subject under the following main headings:—(1) Marine formations; (2) Formations of the beach; (3) Formations of the forest-country; and these are further subdivided. He then gives an enumeration of the plants collected, and points out that the chief mass of the island vegetation is composed of gymnosperms; that the monocotyledons are more numerous than the dicotyledons; and that the ferns are profuse in number, but poor in species.

It is, we suppose, to show off the half-tones of the plates that the paper is so heavily mineralized. The volume is the heaviest one for its size that we have ever held in our hands.

A. & E. S. G.

Die Selbsterhitzung des Heus; eine biologische Studie. Von Dr. Hugo Miehe. 8vo, pp. 126. Jena: Fischer. 1907.

When scientific research is directed to the elucidation of long-familiar phenomena, the interest aroused is prompt and keen, especially if the explanation offered meets all the facts of the case. The heating of hay or corn too hastily garnered, which may even result in spontaneous combustion, is one of these natural happenings well known to all who are interested in agriculture. It has been demonstrated to be due to bacterial action, and Dr. Hugo Miehe, of Leipzig, has published an elaborate treatise, setting forth the results of his many experiments on the subject.

He records first of all the different cases in which such physiological heating occurs: in grasses, where a moderate amount of heat is encouraged and utilized in the formation of ensilage; in tobacco-leaves, where it is a factor in the ripening process; and in hotbeds of manure, which are valuable to the gardener. Hops, on the contrary, are spoiled by heating, and careful drying is essential. The conditions required to induce heating are a sufficient moistness, and a large enough quantity of the material to ensure tight packing and the consequent absence of ventilation. Miehe secured these condition with a quantity of freshly cut hay, and his first experiments were directed to gauging the rise of temperature in different parts of the mass; the detailed results are given in tabular form. On the second day the hay begun to "steam" and take on the characteristic odour of decaying fruits. In six days the highest temperature, 68·5° centigrade, was reached at the centre of the mass.

Evolution of heat is often due to chemical changes, but Miehe, by a further series of experiments, proved that heating in hay was due solely to biological action. He sterilized his material and got no change in temperature; the same hay was then sprinkled with water in which hay and earth had been soaked, and self-heating quickly followed. All the experiments pointed to the connection of some living organisms with the heating process. Further exami-

nation by careful cultures proved that these were chiefly a form of *Bacillus coli*, *B. calfactor*, n. sp., and *Oidium lactis*. These three were the characteristic micro-organisms causing the fermentation of the hay, but others were more or less constant, and they also were isolated and cultivated. *Actinomyces thermophilus* occurred in great abundance, as white specks and streaks on grass still fresh and full of sap. *Thermomyces lanuginosus* appeared when the temperature was at the highest point. *Thermoascus aurantiacus*, n. g., n. sp., showed itself as tiny yellow specks, also on strongly heated hay; it is one of the lower Ascomycetes, characterized by a group of hyphæ and oval-shaped asci, which somewhat resemble those of *Gymnoascus*, but there is in *Thermoascus* a pseudoparenchymatous peridium. It also is a thermophil fungus, and grows only at high temperatures. Other fungi that were frequently found were *Aspergillus fumigatus*, not exclusively thermophil, but growing best at blood-heat; *Mucor pusillus*, which requires considerable warmth to induce vigorous growth; *M. corymbifer*, occasionally met with in laboratory cultures or on diseased bodies, though its true habitat is now proved to be heated plant remains. Most of these thermophil bacilli and fungi are more or less pathogenic, some of them dangerously so. It is a new discovery that they are thus constantly being generated in nature. Miehe is of opinion that manure heaps and plant remains may be the hot-beds of other bacilli, and that tuberculosis in animals may be propagated in this way.

Other chapters are devoted to self-sterilization: it was found that the organisms died off completeiy. The reason of this has not been satisfactorily demonstrated. The fermentation of tobacco, respiration, heat, &c., are also discussed at some length. Dr. Miehe has made a valuable and interesting contribution to bacteriology, fungology, and agriculture; and the carefully tabulated experiments and illustrations enhance the value of his work.

A. L. S.

Recent American Nomenclature.

The eleventh volume of "Contributions from the United States National Herbarium" issued last October is devoted to a *Flora of the State of Washington* by Prof. C. V. Piper, and is the result of his study of the plants of that State during a period of twenty years. It is a handsome book of 637 pages, with numerous illustrations showing aspects of vegetation, and is evidently executed with great care. The introductory matter contains brief biographies of the principal "botanical explorers of Washington"; some of the statements as to the whereabouts of collections require modification—*e. g.* Scouler's plants are not at the British Museum but at Dublin, and the most complete set of Douglas's plants is in the National Herbarium at the British Museum, not at Kew.

We regret however to observe that Prof. Piper owns no allegiance to the Rules promulgated by the Vienna Congress, but "aims to follow the recently proposed Philadelphia Code." This seemed to us a new authority, but Prof. Piper informs us that it is the

"Code of Botanical Nomenclature" signed by a number of American botanists and submitted to the Congress as a substitution *en bloc* for the Code of 1867. We made some allusion to this in our pages for 1904, and pointed out that, while very carefully drawn up, it embodied certain principles, such as that of "priority of place," which would hardly be accepted, as indeed they were not. If, as Prof. Piper's action seems to indicate, transatlantic botanists do not fall in with the decisions arrived at by the international assembly after very careful discussion, the confusion which we—in common with most botanists—had hoped was at an end will still prevail so far as American plants are concerned. It is not even as though the American botanists presented an undivided front; there are conspicuous omissions from the list of signatories to the "Philadelphia Code," so that it may be feared that even in American books uniformity will not be attained; and in so far as this is departed from, the Congress, influential and representative as it was, must be regarded as having failed to obtain complete success.

Certain other peculiarities which have distinguished some American authors are observable in Prof. Piper's book. The system of trinominals is in full force, and it is thus impossible to tell whether the plant represented by the second trivial is to be considered a subspecies or a variety. Such a combination as "*Festuca rubra kitaibeliana* (Schultes) Piper, Contr. Nat. Herb. 10, 23, 1906," contains in itself objectionable features contrary to the ruling of the Congress, which implicitly condemned trinominals, laid down that "when two or more groups of the same nature are united, the name of the oldest is retained" (Art. 46),* and that all names derived from persons must be spelt with a capital letter. The treatment of *Festuca*, by the way, throws a light on the value to be attached to recent American creations, no fewer than six supposed species being here placed as synonyms.

In other respects the Rules are ignored; we have duplicated names—"*Phegopteris phegopteris* (L.) Underw." (note the omission of the capital initial to the repeated name); and the generic names which it was decided to abandon are in full force—how is *Peramium* to be justified? (see Journ. Bot. 1906, 396).

We have noted in recent American floras the citation of what is called the "type locality." This may be a useful innovation when the locality is known, but Prof. Piper seems to regard it as a necessary feature, with the result that we get such entries as "Type locality, European" or "Type locality, 'Habitat in Anglia, Gallia.'"

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* The *Festuca* in question already possessed two varietal names—*F. rubra secunda* Scribn. and *F. rubra pubescens* Vasey. The example given in the Vienna Rules is "*Lythrum intermedium* Ledeb. (Ind. Hort. Dorp. [1822]) regarded as a variety of *L. Salicaria* L. must be called *L. Salicaria* var. *gracilius* Turcz. (in Bull. Soc. Nat. Moscou, xvii. 235 [1844]) not *L. Salicaria* var. *intermedium* Koehne (in Engl. Bot. Jahrb. i. 327 [1881])."

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on February 7th, the Rev. John Gerard, S.J., brought forward "Some Observations of Climbing Plants," illustrating his remarks by lantern-slides from his own photographs from living plants and herbarium material. He began by pointing out the two opposing methods of describing spiral growth or torsion as viewed from the exterior or from the interior of the spiral, the result being that the "dextrorse" of the first is the "sinistrorse" of the second method. With or against the sun, which applies to the northern hemisphere, is reversed in the southern hemisphere, and for these reasons he preferred to use the terms "clockwise" and "counter-clockwise" (shortened to "counterwise"); the Honeysuckle (*Lonicera Periclymenum*) and the Hop (*Humulus Lupulus*) turning clockwise, and the Convolvulus (*Convolvulus arvensis*) and the Scarlet Runner Bean (*Phaseolus vulgaris*) twining counterwise. He showed the result of some experiments he had made by growing beans in opaque cylinders, to discover if possible whether the deviation of the twist were innate, or from the direction of the light, the conclusion being drawn that the plant possessed an inclination resembling the instinct of animals, of proceeding in a given direction, and resented any attempt to force it otherwise. The author concluded with some observations on the behaviour of tendrils, as those of *Bryonia dioica*, displaying one specimen which had varied the torsion four times and showed ten turns in one direction against seventeen in the contrary. Dr. Otto Stapf then gave an abstract of his paper on "New Plants from Malaya," giving the history of his new genus *Hallieracantha*, which receives eight species from the genus *Ptyssiglottis* Hallier f., and eleven others are added from the Kew collections; they form a very homogeneous group, are eminently shade-loving plants, and exhibit anisophylly in a very marked degree. The headquarters of the genus are in Borneo.

Dr. Schinz has begun to publish in the Bull. Herb. Boissier for February a series of notes on the changes in the nomenclature of Swiss plants rendered necessary by the Vienna Code. They seem very carefully done, and we are glad to observe that the work of Miller in his *Gardeners' Dictionary* is receiving due recognition. Continental botanists hitherto have paid scant attention to the investigations of our eighteenth century writers; even in so exhaustive a work as the *Genera Siphonogamarum* this neglect is noticeable—*Radiola*, for example, is there attributed to Roth (1788), whereas it was established by Hill in 1756. In citing for *Alnus rotundifolia* "Miller Gard. Dict. ed. 7 (1759) n. 1," Dr. Schinz, however, falls into a curious error: there is no such name in the work, which, moreover, does not contain trivials, which were added only in the eighth edition. *A. rotundifolia* appears in Stokes (Bot. Mat. Med. iv. 369 (1812)), and is of course antedated by *A. glutinosa* Gaertn. (1791).

The Trustees of the British Museum have just issued a *List of British Seed-plants and Ferns*, compiled by Mr. Britten and Dr. Rendle in accordance with the International Rules of Botanical Nomenclature adopted by the Botanical Congress at Vienna, 1905. These Rules insist on the adoption of the earliest specific name of a plant, no matter under what genus it was first described. This has resulted in a few alterations, as British botanists have generally used the specific name first employed in the genus accepted; these alterations have been made only after careful investigation of the literature of the subject; a detailed account of the more important will be found in this number of the Journal. The compilers are not so sanguine as to suppose that their conclusions are free from error, but they can at least claim that the *List* is the result of an extensive and careful consultation of botanical literature, for which the fine library of the Department of Botany has afforded exceptional opportunities. The arrangement of Orders is that of Bentham's *Handbook*, which is followed in the Public Gallery; for the limitation of genera and species, Messrs. Groves's edition of Babington's *Manual* is followed; the nomenclature of the latter work is adopted except where this is not in accordance with the Rules. The *List* has been shortened by the exclusion of (1) Channel Island plants, which have no claim to be considered as belonging to the British Flora; (2) critical forms of *Rubus*, *Hieracium*, *Euphrasia*, and *Salix*, for which reference must be made to monographs; (3) introduced plants which have not become thoroughly established; (4) plants formerly found in Britain, but now extinct.

The death is announced of yet one more botanist named Robert Brown. This last sharer of an honoured name is the subject of a notice by Mr. L. Cockayne in a New Zealand paper—the *Lyttelton Times*—to whom we are indebted for a copy. Unfortunately, long as it is, the notice is singularly deficient in definite information. Brown "came to the colony more than thirty years since"—we are not told whence—and "for a number of years followed his pursuit as a shoemaker, but latterly that was abandoned altogether, and his time was passed with his microscope, in his beautiful garden, or away in the wilds over the length and breadth of New Zealand." He devoted himself especially to mosses, on which he published numerous papers, illustrated by himself, in the *Transactions of the New Zealand Institute* for 1892 and following years, describing a large number of new species. He was a self-educated man, and a great walker: "at the age of seventy and upwards he was wont to walk thirty and even forty miles in one day, carrying a heavy burden; it is only a little more than a year ago, and when over eighty years of age, he walked, botanizing, all the way from Kaikoura to Blenheim." Brown died at his residence at St. Albans, near Christchurch, Dec. 13, 1906.

Mr. F. N. Williams is publishing in the *Bulletin de l'Herbier Boissier* a "Florula Gambica," for "the area comprised within the present political limits of the colony of the Gambia, as finally settled in the Anglo-French agreement dated October 1905." The collections enumerated date from 1750, in which year four plants

were collected by Adanson; "the earliest record of a plant for the colony is in Dillen's *Hort. Eltham.* p. 369, t. 227, f. 358 (1732), where *Spermacoce globosa* Schum. & Thonn. is described from cultivated specimens under the name of Spermacoce verticillis globosis. A specimen is preserved in Dillen's herbarium at Oxford."

THE news of the sudden death at San Remo on Jan. 28 of OTTO KUNTZE, in his sixty-fourth year, will come as a surprise to those who have so lately received his latest *brochure* issued in January, and bearing the portentous and characteristic title, "Motivierte Ablehnung der angeblich vom Wiener Kongress 1905 angenommenen inkompetenten und fehlerreichen botanischen Nomenklatur-Regeln, sowie Vorschläge zur international endgültigen Reform auf dem Brüsseler Kongress 1910." Dr. Kuntze, who is chiefly known as a leading polemic in matters relating to nomenclature, and in whom the *suaviter in modo* cannot be said to have accompanied the *fortiter in re*, was a systematic botanist of no mean ability in 1867. His earliest books, published in that year, were a Flora of Leipzig and a critical revision of German Rubi which was followed in 1879 by *Methodik der Speciesbeschreibung und Rubus*—an elaborate work. He also monographed *Cinchona* and *Clematis*, and his most important work—the *Revisio Generum* (1891-98)—contains numerous descriptions of new species obtained during his travels in South America and elsewhere, when he made large collections. But it is in connection with the revision of nomenclature that his name will chiefly be remembered, and it is to be regretted that the intolerance of his views and the intemperance of the language in which they were stated led to a somewhat insufficient appreciation of his labour and research. This Journal, in which several of his papers have appeared, has always recognized the importance of his work, notwithstanding obvious shortcomings in taste and temper; the *Lexicon* which, in conjunction with Dr. von Post, he published in 1904, should, as we said when reviewing it, find a place in every botanical library.

Two very pretty little halfcrown (net) books come to us from Mr. T. N. Foulis of Edinburgh, belonging to "The Garden Lovers' Series." The first—*A Garden of Pleasant Flowers*—consists of descriptions of the most familiar garden flowers from Parkinson's *Paradisus*, compiled and arranged by Mr. Alfred H. Hyatt. We have often thought and said that such a selection might well be made, if only on account of the delightful English written by Parkinson and most authors of his time, and here it has been well made. The epistle to the reader, and a small part of the introduction on "The Ordering of the Garden of Pleasure"—not, we think, the best part—are prefixed to the selections. "Paridisi" on the title-page is an unfortunate misprint. The other volume, also edited by Mr. Hyatt, is Reid's *Scots Gard'ner* (1683), to which Lord Rosebery contributes an "appreciation." In each of these books the original spelling is preserved, which in some way not easy to define adds greatly to their attractiveness. They are beautifully printed and suitably bound and cheap, and in these garden-loving days are sure to have the sale which they deserve.

Mr. T. E. Waltham has prepared a successful series of stereoscopic photos of plants in their natural colours, which he has lent for exhibition in the Department of Botany at the Natural History Museum. The series includes a number of orchid flowers and other objects, as well as some general views, such as primroses in a wood, water-lilies on a pond, and a border of herbaceous plants.

We are indebted to a correspondent for the following example of "science as she is taught" by our popular magazines. It is from the *Royal Magazine* for April, one of Messrs. Pearsons' publications, and is accompanied by a figure of *Dionæa*, labelled "*Dronca Muscipula*." :—"In the vegetable kingdom we find a counterpart which exactly corresponds with the mouse-trap. The plants (if plants they be) [!] which exist by enticing on to their leaves flies and other small insects, exude a sweet gum which, when a wandering insect alights upon it to feed, partially entangles its legs. In the effort to release itself the insect struggles violently, and its wings become involved with the same sticky substance. The time occupied by the little insect in endeavouring to escape is long enough to enable the plant to exert its consciousness, and the fatal petals, which are surrounded by sharp teeth, close upon the living fly and keep it a fast prisoner while its blood is absorbed by the plant. Then the trap uncloses and throws out the skeleton that remains."

Dr. Nordstedt, who is a member of the "Commission de Nomenclature Cryptogamique" appointed at Vienna to report to the Congress of 1910, has published (*Botaniska Notiser*, 1906, pp. 97-106) an important paper on "The Starting-point of the Nomenclature of Desmids," in which the matter is exhaustively and so far as we can judge very sanely discussed. He sums up his paper thus :—

"I propose the following rules for the nomenclature of the Desmidiaceæ. 1. The nomenclature begins with The British Desmidieæ by Ralfs 1848. 2. The authors of names given earlier, but accepted by Ralfs in Brit. Desm., must always be quoted as such (e. g.—Ehrenb. sec. Ralfs in Brit. Desm.), except if the identification of the name in Ralfs' Brit. Desm. and in the works of the older authors be very doubtful. 3. Exceptions. The following earlier specific names have priority and must be retained: *Closterium Libellula* Focke (if removed from *Penium*) and *Desmidium cylindricum* Grev. (*Didymoprium cyl.* Ralfs 1845). The rule 3 is naturally not quite necessary.

"For several other sections of algæ there are also standard works, from which their nomenclature can begin. I will here mention 3 such works, although the selection of names in the two last-mentioned ones has been quite too much dependent on whether their authors saw original specimens or not :—Hirn, K. E., Monographie und Iconographie der Oedogoniaceen. 64 Tab. in 4:o. Helsingfors 1900; in the tables nearly all the known species are represented: Bornet, Ed., et Flahault, Ch., Revision des Nostocacées hétérocystées contenues dans les principaux herbiers de France. Paris 1886–88: Gomont, M., Monographie des Oscillariées (Nostocacées homocystées). Paris 1893."

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THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

PAGE

Notes on British Rubi. By Edward Gilbert, M.D. 129

Notes on *Halorrhagaceæ*. By James Britten, F.L.S. 135

Notes on the Flora of Flintshire. By A. A. Dallman, F.C.S... .. 138

Notes on African Plants. By Spencer le M. Moore, B.Sc., F.L.S. 154

Seed-Production in Violets. By E. S. Gregory 155

Euphorbia Peplis L. in Britain. By C. E. Salmon, F.L.S. 158

Watson Exchange Club Report, 1905–6 160

PAGE

Short Notes.—*Lithospermum officinale* L. var. *pseudo-latifolium* in Cornwall. — *Alnus rotundifolia* Mill.—A Glamorganshire Sedge. —*Fumaria Boræi* Jord.—*Sisymbrium pannonicum* Jacq. in Cheshire.—A Hybrid *Erigeron*.—*Stipa membranacea* L.—A Correction 162

Notice of Book:—

Recent Progress in the Study of Variation, Heredity, and Evolution. By Robert H. Lock, M.A. 165

Book-Notes, News, &c. 167

Supplement.—A Flora of Glamorganshire. By H. J. Riddelsdell, M.A. (continued).

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JAMES BRITTEN, K.S.G., F.L.S.

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NOTES ON BRITISH RUBI.

By Edward Gilbert, M.D.

I.—The Suberecti.

Before venturing to make any comments on the British Rubi which may be noticed by eminent students of the British Flora, it seems to me only proper that I should give some slight reasons for my boldness. The main one is that I have worked very hard the last ten years (with the exception of one when I was very ill) in the field and at my own and the National Herbaria in an attempt to determine the position every *Rubus* I could find held in the Rev. W. M. Rogers's *Handbook of British Rubi*, and in the *London Catalogue of British Plants*. In this effort I have had the kind and essential assistance of Mr. Rogers himself. Neither was I quite a novice in the study of Rubi, for I began it in the year 1857 under the guidance of a most careful and clever botanist, Mr. George Jordan, of Bewdley. Another reason is that the immediate neighbourhood of Tunbridge Wells seems to be favoured with an extraordinary variety of Rubi. To a small portion of that my search for them has been mainly limited. In a ninety hours' methodical search of our common one year I found over forty different Rubi. In the year 1902 Mr. Rogers favoured me with a visit for a week, when the Rubi were at the height of their flowering. He was astonished at the variety to be found. A considerable proportion of them he was unable to refer decidedly to any species or variety known to him—even one of the most abundant, which he proposed to call *R. tonbridgensis*. The effect of all this work and comparison of notes on my mind has been a strong impression that the variety of forms of Rubi is practically unlimited, and that many of them are so closely inter-related that it is impossible to separate them distinctly, or to assign every individual to a distinct place in any scheme of arrangement; in fact, that this distinctness is not to be found in nature with regard to a large proportion of them.

Another impression is that the genus is one of wonderful adaptability to its surroundings—extremely "plastic" one may say. Every spot—wood, lane, hollow, or hill, or what not—seems to make more or less of its own impress on the Rubi that grow there, even the different sites on a varied common such as ours. So much is this the case, that these local distinctions sometimes obscure those that are specific by the resemblance they produce. The great differences found in the form and appendages of the leaves of the same bush seem to me further evidence of this great instability. Even the same bush I have known alter its features so much in two successive years that specimens from it in each of those years would have been supposed to come from quite different Rubi, if their source had not been known. Is not this adaptability of the Rubi the chief source of their ubiquity?

A third impression which has grown strongly upon me is that

the Rubi cross very freely; and, if so, of course not only would the hybrids be very various, but each kind of hybrid would vary a good deal, thus adding confusion to the confounded. It has been told me that it is pure theory to suppose any *Rubus* to be a hybrid. Is it not just as much so to suppose it to be an independent species when it closely resembles two others? *R. Idæus* and *cæsius* are admitted to cross. Why not then all the intermediate ones? I am not unlikely to be mistaken; but I fancy I have noted the following things to indicate crossing in the Rubi:—A striking resemblance to some salient feature in each of two other neighbouring Rubi combined with an intermediate character on the whole; a very sparse distribution—an isolated individual occurring here and there, and not large numbers, about the same spot, as commonly happens with the distinct species; fasciculation of the branches of the panicle; and sometimes some abnormality in growth. Whether what I take to be probably hybrids are less fertile than other Rubi, I cannot say. I have not observed that they are. In California the fruit-growers have found that certain horticultural varieties of fruit trees are incapable of *self*-fertilization, and that their fertilization can be secured by planting *other* varieties near them. Is it not likely therefore that the same end may be attained in the same way in nature? What an endless and continually changing variety this would lead to!

My close observation leads me to gather that such a variety does exist among the British Rubi, and this suspicion is much strengthened by the partial confusion which all others, as well as myself, appear to get into when we try to relegate every *Rubus* to some distinct and exact spot in any regular scheme of arrangement; and also by the remarks that have been made in the course of doing so. Is not the provision of a clump of *Egregii*—very unlike to one another—a clever device to lessen the difficulty? Nevertheless careful attempts to form a complete classification must be a most valuable, perhaps essential, step towards an accurate knowledge of any difficult genus. There are certain species (or forms) which stand out conspicuously from all the others, and are easy to name and remember. But there are still more numerous intermediate forms which resemble, it may be equally, two or more of the leading ones, and still more closely resemble one another without being identical. These are the ones that do not lend themselves readily to classification. The difficulty is increased, moreover, by their being usually far less abundant, and consequently much less frequently seen. Thus the eye cannot get so familiarized with them in the fresh state. My own observation has led me to suspect that this thinness of distribution is the main cause why so many have been recorded for only a very few counties, rather than a want of wide distribution. I have found so many of those supposed to be rare in a very small space near me. It needs continuous as well as long-continued viewing of the Rubi one is already acquainted with to keep one's eye familiar with their distinctive features. If one studies the comital numbers for the distribution of each species at the end of Mr. Rogers's *Handbook*, it will be seen

that those given for the rare species accord with suggestive frequency (I think) with those of the commoner species which they most resemble.

I may say a few words on what have appeared to me reliable or fallacious signs of specific difference among Rubi. No one who has observed them much can have failed to notice how much the leaves vary, not only in the same *Rubus*, but even in the same plant. This may be well seen in *R. Idæus*. Luxuriance makes the leaves larger, and especially wider, and the serration coarser. Leaves may be ovate or obovate in accordance with the vigour or want of vigour in a *Rubus*. Felt is a somewhat uncertain thing, its development being apt to fail if the bush or a part of it grow in the shade.

The colouring of the prickles where the sunshine can reach them appears to me to be remarkably uniform in each *Rubus*, and well worthy of notice in determining the species.

In species in which the sepals become erect, this fails to happen when fertilization of the carpels does not take place (often, if not always).

The comparative prominence of the stamens and styles is an uncertain thing (as it seems to me), depending upon the luxuriance of the plant; when this is high the stamens (and petals too) being longer. The hairiness or hairlessness of the petals is sometimes a valuable distinction.

Having made these general comments on the Rubi, I now venture some on a few individual Rubi :—

R. Idæus L. The distinctive characters of the var. *asperrimus*, besides its crowded aciculi, or prickles, seem to be smaller size, tortuosity of the stem, greater hairiness, no acumination to the leaves, which are much more rugose, and yellow fruit. The colour of the prickles may be either "tawny," drab, or purple. It is undoubtedly wild on Tunbridge Wells Common, which is really a moor.

R. fissus Lindl. and R. suberectus Anderson seem to me very doubtfully distinct. Plants in which some of the supposed distinctions of one are combined with those of the other are found. Mr. Moyle Rogers asserts that *fissus* becomes like *R. suberectus* in damp places. The asserted differences between the two are just those that occur with many another *Rubus* when it grows in a dry sunny place and when in a damp shady one.

M. Sudre points out that Hall's description of his *nessensis* will apply equally well to either *fissus* or *suberectus*. The specimens of them in the "Type Set of British Rubi" do not seem to make the distinction clear.

If the specimens of *R. suberectus* and *R. fissus* in the national collections are examined, it will be seen what difficulty there has been, and what uncertainty after all, in deciding to which species some of them belong. In the *Handbook* there is also a plain intimation that the same difficulty will occur. The same remarks will apply to the distinction between *R. sulcatus*, on the one hand,

and *suberectus*, *plicatus*, and the white form of *R. nitidus*, on the other.

Now I have found in woods at Lingfield *R. suberectus*, and also a *Rubus* of similar tall, straggling growth, &c., but with leaves, stem, and prickles like those of *fissus*, and still more like those of *corylifolius*, and suggesting very strongly (to my mind) hybridism between *suberectus* and *corylifolius*. The close resemblance between the leaves, stem, and prickles of *fissus* and *corylifolius* will be seen on comparing Mr. Rogers's descriptions of them. If my plant is such a hybrid, of course it obscures the distinction between *suberectus* and *fissus*; if it is not, then those two can hardly be distinct. Testimony in favour of the former alternative is, I think, furnished by the fact that this plant in the same woods is very variable; in some cases resembling *suberectus* much more than *fissus*; in others, *plicatus* or *hamulosus*; and is indistinguishable from specimens of *R. sulcatus* in the national collections. But it is always tall, straggling, and large-leaved.

M. Sudre has recently sent to the British Museum specimens of the same plant, which he calls *sulcatiformis*, and thinks is really *suberectue* × *cæsius*. Is *fissus* distinct from it?

R. SULCATUS Vest. appears to me an ill-defined species. I have found it, I believe, on the border of a wood in the neighbourhood of *fissus* or *suberectus*, of either of which it might well be a luxuriant straggling form, such as is found of other Rubi when growing in deep shade and on rich soil. One specimen, indistinguishable by me from one in the "Type Set," was referred by Mr. Rogers to *R. plicatus Bertramii*. The probable explanation seems to me to be that any of the three—*fissus*, *suberectus*, or *plicatus*—may assume the characters of *sulcatus* under somewhat exceptional, but similar, circumstances. It may be found more or less like and indistinguishable from any one of them. From that fact, and from specimens I have gathered, I infer that *R. sulcatus* has been artificially formed out of white *Suberecti* whose axes have been spun out and their leaves enlarged by growth in damp shady situations among other shrubs.

R. PLICATUS Weihe & Nees is found on open spaces near Tunbridge Wells. There are two well-marked varieties of it, between the first flowering of which there is an interval of about a fortnight. The smaller, var. *hemistemon* (P. J. M.), has a less hairy panicle and calyx, much shorter anthers and shorter petals, sepals less reflexed, the leaves on the panicle less pointed, and fewer prickles there. The bracts, too, are smaller and undivided. It is much smaller, grows more erect, less among other bushes, but more in open ground, unsupported, and in large groups. It flowers much more profusely, and has more numerous panicles arranged alternately along the stem. The fruit in *cool, wet summers* is apt not to turn black. The other form (var. *Bertramii* G. Braun) is equally common, and often grows close to the small one. Intermediate forms may occasionally be found. But I will venture to say that these two varieties are more different and distinct than are many

Rubi commonly held to be distinct species. Another form of *plicatus*, or resembling it, is not uncommon about here. It is of lower growth, and has very numerous small, very strongly hooked and decurved prickles, and leaves very doubly and acutely serrated. This form is not, however, very distinct from the last. I suspect it has often been mistaken for *R. nitidus*, and may be *R. hamulosus* L. & M.

R. Rogersii Linton. A specimen lent me by Mr. Rogers, one in his "Set of British Rubi" at Kew (labelled *opacus*), and one or two which I have gathered, are all precisely alike; but none have the cordate leaves or crowded prickles mentioned in his *Handbook*. Mr. Rogers himself cannot always distinguish even living *hemistemon* from *Rogersii*. M. Sudre considers it a subspecies of *affinis*. I have not a very free acquaintance with it, and may be wrong in suspecting it to be a hybrid between *nitidus* (Wh. & N.) and *affinis* (partly from its very thin distribution where I have found it), or a mere variant of the former. It has aciculi upon the calyx like *nitidus*.

What I have described as a "third form" of *plicatus* appears to me to have been included by Mr. Rogers in his description of R. nitidus, and is probably *R. hamulosus* of Lefvr. & Muell. This is a much commoner plant here than the true *nitidus*, and appears to me much more like *plicatus* than it is to the other form of *nitidus* or to *opacus*. I suspect strongly that I have found hybrids between it and *suberectus*, *affinis*, *Balfourianus*, and *Sprengelii*. There are numerous intermediates, perhaps hybrids, also between it and *plicatus* (*hemistemon*), which combine their characteristics in different ways. Not improbably, I think, *plicatus Bertramii* is one of these. Luxuriant and straggling specimens of it, moreover, have been named by some of the most eminent British authorities, I submit, *R. lentiginosus*, and by me *R. integribasis*. Its close resemblance to *R. orthoclados* has also been noticed by Mr. Rogers and me together, as also its resemblance to *affinis Briggsianus* (Rogers), which Dr. Focke refers to *nitidus*. By far the most probable explanation of all this seems to me to be that all the plants referred to are hybrids, with one parent, *nitidus* (or *hamulosus*) in common, and therefore, of course, vary a good deal. Their sparse distribution and some of their other features point to the same conclusion. Not less so does the difficulty which the best judges appear to find in distinguishing them clearly from their nearest allies and from one another. This difficulty is evident on carefully inspecting the collections of Rubi in the National Herbaria, from the frequency with which the same *Rubus* is named differently, and the same name given to different Rubi. M. Costa considers *R. integribasis*, *R. hamulosus*, and *R. holerythros* to be all varieties of *nitidus*.

I have occasionally met with another plant bearing all the appearance of a cross between *R. nitidus* or *hamulosus* and one of the other *Suberecti*, especially *affinis*. Some of the specimens labelled *R. opacus* in the national collections and the "Type Set" are just like these; others so labelled differ from those; and taken

as a whole there seems to me nothing definite about them, except some general resemblance to *R. nitidus*. One labelled *opacus* in the "Set" is referred by M. Sudre to *nitidus*, another to *integribasis*, doubtfully, by M. Sudre. Mr. Rogers's description of *opacus* applies well to typical *R. nitidus*. Have not one or more hybrids been gathered under its fold as well, while others related *on one side* to them have been assigned places as varieties of some other species, or even as distinct species themselves?

There appears to me to reign even more confusion about *R. nitidus* than about the other *Suberecti*. Mr. Rogers describes it first as having "nearly straight or falcate prickles." But a few lines lower he says, "the typical plant, with its strongly hooked prickles" has bright pink flowers, though there is a white variety, which is *R. hamulosus*. This last plant I believe to be common about Tunbridge Wells; but I have never seen the pink one. In one spot only have I found a plant exactly like the illustration of *R. nitidus* in the *Rubi Germanici* of Weihe & Nees, and as like a specimen of it at Kew from Dr. Focke. But this appears to me to agree with Mr. Rogers's description of the subsp. *opacus*. It is a very distinct plant. In the National Herbaria, however, are specimens named *opacus* (Focke) differing from that; yet, I submit, indistinguishable from others, named *integribasis*, *Briggsianus*, a var. of *affinis*, *sulcatus*, and *plicatus*.

These appear to be intermediates (hybrids, probably, I suggest) between *nitidus* and one or other of the other *Suberecti*, especially *R. affinis*. I have found isolated specimens of them on our common, where *affinis* and *plicatus* are abundant, and *hamulosus*, I believe, is to be found; and I have been sufficiently puzzled by them.

R. INTEGRIBASIS P. J. Muell. is another of the indistinct group of plants between *affinis* and *nitidus* or the other *Suberecti*. But I gather that there are also other sources of error in connection with it. One is a plant I have found which suggests to me strongly a cross between *plicatus* (or *hamulosus*) and *Balfourianus*. Another is a weakly plant I once found and thought to be *R. integribasis*, an opinion which was confirmed by finding a specimen like it so named in the National Herbarium. It is, however, different from any other specimens of *integribasis*, and more recent consideration has induced me to think it *R. rusticanus* × *Sprengelii*. One specimen in the "Type Set" at Kew, named *integribasis*, is held by M. Sudre to be *Questieri*. In every vice-county in which *integribasis* is said to be found (in the Appendix to Mr. Rogers's *Handbook*) *nitidus* is also found, and also *plicatus*; and *Balfourianus* in all but one. In some cases probably *R. plicatus* × *Sprengelii* has been taken for *integribasis*; and also a hybrid between one of the *Suberecti* and one of the *rhamnifolii*. It is worthy of note, I think, that there is a great deal of resemblance between *R. nitidus* and *R. Sprengelii*, which comes out very strongly in the description of the two in Mr. Rogers's *Handbook*.

If my observations are correct, it follows that *R. integribasis* figures in the national collections under the names of six other *Suberecti* also. This, I should gather from what I have found in

the field, duly represents the natural state of things, but that its relationship to *nitidus* and *affinis* is the most frequent. When its petals have a tint of *lilac*, as mentioned by Mr. Rogers, it has been noticed by me to have also other signs of a connection with *Balfourianus*—a very common *Rubus* here.

R. affinis is abundant here, and a very distinct species. *R. holerythros* Focke I have not been able to make out as a distinct species. The name seems to have been applied to luxuriant specimens of *affinis*, and to intermediates (hybrids?) occasionally occurring between *affinis* and some Rhamnifolian. *R. affinis* × *dumnoniensis* and × *carpinifolius* may, I believe, be occasionally found upon our common.

Mr. Rogers says that *R. rhombifolius* Weihe, which includes, so Dr. Focke states, *R. carpinifolius β roseus*, cannot always be distinguished from *R. holerythros*. It seems to me that there is good reason to think this is because they are both hybrids of *affinis* with the same or different Rhamnifolians; and that some of these hybrids are as much like one as the other, *holerythros* and *rhombifolius*—that they are a hybrid, variable as hybrids always must be.

It will thus be seen that the reputed rarity of a *Rubus* runs very much with its thinness of distribution and its indefiniteness of distinction.

(To be continued.)

NOTES ON HALORRHAGACEÆ.

By James Britten, F.L.S.

Last autumn Dr. A. K. Schindler visited the National Herbarium and went through our *Halorrhagaceæ*, making interesting notes upon the sheets. He had not seen the Herbarium before publishing his monograph of the order (*Das Pflanzenreich*, 23 Heft (iv. 225)), and it may be worth while to print certain of his determinations, especially of Robert Brown's Australian plants, which supplement the information therein given. The notes follow the order of the monograph.

Haloragis scabra Benth. The type of the species—*Goniocarpus scaber* Koenig in Ann. Bot. i. 547 (1805) (*Ludwigia octandra* Banks Herb. !) from Macao, D. Nelson, 1780—is referred by Dr. Schindler to his var. *α elongata*.

H. Meziana Schindler. R. Brown, Iter Austral. no. 4554.

H. rubra Schindler. Walter's plant, on which this is based, was distributed by Mueller as *H. tetragyna*.

H. tetragyna Hook. f. No. 4416 of Brown's collection (from Port Jackson) consists of three plants, named by Schindler respectively *H. tetragyna* var. *genuina*, *H. tetragyna* var. *bicallosa*, and *H. teucrioides*. No. 4115, from "perforated granitic mountain, Bay I.

South Coast, Jan. 1802," is *H. tetragyna* var. *hispida* Schindler, which is not localized in the monograph. A sheet of specimens collected by Banks at Cape Grafton in 1770 contains *H. teucrioides* and *H. tetragyna* var. *genuina*.

H. AGGREGATA Buchanan "var. *a* DIFFUSA (Hook. f.) Schindler." There would seem to be some confusion about this name. The *H. tetragyna* var. *diffusa* of Hook. f. was based on the plant called by Banks and Solander *Cercodia procumbens*, but this Dr. Schindler names (in herb.) *H. aggregata* var. *incana*, applying the name *diffusa* to a very small-leaved plant which certainly agrees better with the descriptions. I find an example almost exactly corresponding with this among the Banksian duplicates; the specimens show considerable range in the size of the leaves, and the form seems hardly to deserve a name. The figure does not agree with it.

H. LONGIFOLIA Schindler. To this Dr. Schindler refers Brown 4419 and 4420, from Port Jackson, which Bentham placed under *H. tetragyna*.

H. SALSOLOIDES Benth. Dr. Schindler does not cite under this Brown's specimens (no. 4432) on which Bentham's description was largely based. The citation of the name as "*H. salsoloides* (Reichb.) Benth." seems unnecessary, as Reichenbach's name in Sieber's exsiccata and in Steudel's *Nomenclator* was a mere *nomen nudum*.

H. DIFFUSA Diels. Dr. Schindler refers to this the plant distributed by Mr. C. P. Andrews (no. 288) as *H. teucrioides*.

H. HETEROPHYLLA Brongn. var. *capreolicornis* Schindler. To this are to be referred Brown's plants from Port Jackson and Port Dalyrmple (nos. 4430 and 4431).

H. LÆVIS Schindler. Brown's Grove River plant (no. 4427), placed under *H. alata* in the *Flora Australiensis*, is identified by Dr. Schindler with his *H. lævis*.

H. TENUIFOLIA Benth. Dr. Schindler places here the plant named *H. Gossei* F. Muell. in Journ. Bot. 1897, 165 and Journ. Linn. Soc. XXXIV. 190.

H. BREVILOBA Schindler. The plant distributed by Mr. C. P. Andrews (no. 289) as *Meionectes Brownii* is referred here by Dr. Schindler; it was collected near Perth, W. Australia.

H. simplex R. Br. MSS. (*H. pusilla* var. (?) *subaphylla* Benth. Fl. Austral. ii. 481). On the sheet of specimens Dr. Schindler has noted—"Certainly different from *H. pusilla* and not a variety of same; perhaps near *H. salsoloides*, but there being no flowers and fruits, not determinable." Brown's MSS. contain a full description of both flowers and fruit, which it seems desirable to publish:—

"*Haloragis simplex*. Calyx superus quadripartitus. Laciniæ vix semilineares, erectæ subulato-lanceolatæ planæ acutiusculæ glabræ æquales. Corolla tetrapetala. Petala epigyna oblongo-saccata, navicularia, cum laciniis calycinis alternantia usque plus triplo longioribus, glabris rubicundis basi in unguem brevem

angustum attenuata decidua. Stamina epigyna petalis longiora; filamenta 8 æqualia capillaria tenuissima glabra pallida distincta; antheræ basi insertæ, oblongæ glabræ stamineæ biloculares loculis appositis medio longitudinaliter dehiscentibus. Ovarium inferum obtuse tetragonum glabrum; styli quatuor filiformes erecti æquales staminibus (etiam petalis) breviores longitudinaliter hispidi; stigmata simplicissima acuta. Flores alterni, sessiles remotiusculi (internodiis plus duplo breviores) tribractea. Bracteæ erectæ membranaceæ fuscæ, exterior major fere longitudine floris, concava oblonga acuta; laterales ovarii circiter longitudine subulato-lanceolatæ planiusculæ. Caulis simplex vel basi parum divisus erectus glaber sulcatus 3–5-pollicaris viridis subaphyllus. Squamis tantum bracteis exterioribus similibus alternis distantibus instructus. Radix fibrosa." (No. 4438.)

Brown gives as the locality "Bay I. South Coast, Jan. 1802." Mr. C. P. Andrews distributes (no. 287) under the name "*Haloragis pusilla* var. *subaphylla*" what looks like the same plant from "swampy ground, Albany," but the material is insufficient for examination.

H. RACEMOSA Lab. var. *angustifolia* Schindler. Dr. Schindler refers no. 4451 of Brown's collection to this variety.

H. PANICULATA Br. and H. LANCEOLATA Br. were not seen by Dr. Schindler when preparing his monograph and their position was therefore doubtful; he notes that the former (no. 58) should follow *H. foliosa* (no. 34).

MYRIOPHYLLUM VOTSCHII Schindler (*M. pedunculatum* Hook. f.) in part. To this Dr. Schindler refers the plant distributed by Kirk (no. 551) from the Bluff, South Island; it is only recorded from North Island in the monograph. Brown's plant (no. 4441) from King's Island, Tasmania, named by Bentham *M. pedunculatum*, is referred by Dr. Schindler to his var. *angustatum* of *M. amphibium*, which he records only from Curdie's River, Victoria.

M. PROPINQUUM A. Cunn. var. *α genuinum*. Dr. Schindler refers here Brown's Port Jackson plant (no. 4443) included by Bentham under *M. verrucosum*. No. 4442 is *M. verrucosum*.

M. ELATINOIDES Gaud. The plant distributed as "*Ceratophyllum demersum* L." in the very badly named set of Bang's "Plantæ Bolivianæ" (no. 800) should be placed here.

GUNNERA LOBATA Hook. f. Dr. Schindler places *Dysemone lobata* Banks & Sol. as a synonym. Sir Joseph Hooker's description was based upon this and on specimens collected by himself on Hermite Island. Dr. Schindler named the Banksian specimens in the Herbarium *G. magellanica*, of which they are clearly small examples. A comparison of these with Parkinson's drawing made during the voyage and cited by Hooker (l. c.) under *lobata* shows that the two do not correspond; and a search among the duplicates resulted in the discovery of two small specimens which are identical with the Hermite Island plant, to which Solander's description also applies. Dr. Schindler did not see Parkinson's drawings, in which both species are represented; he quotes that of *G. magellanica* (*D. inte-*

grifolia Banks & Sol.) "ex A. DC."; both however are cited by Hooker. The very small size of the specimens of *G. magellanica* mislabelled *D. lobata* no doubt explains the confusion which occurred. *D. lobata* Banks & Sol. thus represents two species, as under:—

GUNNERA LOBATA Hook. f.

Dysemone lobata Banks & Sol. Icon.! MSS.! et Herb. (pro parte)! et ex Hook. f., l. c. (pro parte).

G. MAGELLANICA Lam.

Dysemone lobata Banks & Sol. in Herb. Mus. Brit. (pro maxima parte)! non Icon. et MSS.; et in Herb. Vindob.).

NOTES ON THE FLORA OF FLINTSHIRE.

BY A. A. DALLMAN, F.C.S.

HAVING devoted some considerable time to the elucidation of the Flora of Flintshire (v.-c. 51), I have deemed it advisable to place the results of such work on record. Comparatively little attention has been devoted to the botany of Flintshire at any time, which in this respect is perhaps one of the least known of the British counties. For the little which has been done regarding its botanical productions we are chiefly indebted to J. E. Bowman, of Wrexham, who contributed a number of Flint records to the *New Botanists' Guide* and *Topographical Botany*, and the late Robert Brown. The latter compiled a useful list of "Flintshire Plants not recorded in Edition II. of *Topographical Botany*," which appeared in this Journal in 1885. Save a few scattered records nothing of any importance has been published on the subject since that date. Brown's herbarium is now in the Liverpool Museum, and includes a considerable number of Flint specimens. This collection contains some acceptable information, and also several plants hitherto unrecorded for the county, and these are indicated in the following list.

The Flintshire records in *Topographical Botany* are largely based on a "catalogue" of "plants seen in the county of Flint," which was supplied to Mr. H. C. Watson by J. F. Robinson.* All "records" traceable to this source will be ignored by me, just as his "catalogues" for Anglesey and Carnarvon plants—which are also unfortunately incorporated in *Topographical Botany*—were rejected by Mr. J. E. Griffith in the *Flora of Anglesey and Carnarvonshire*. It is to be regretted that the second edition of *Topographical Botany* is rather misleading. A number of Flintshire plants appearing therein, and to which no authority is appended, are merely "records" of this same person, which have been extracted, *minus* the

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[* For further information as to Robinson, see Journ. Bot. 1904, 300.—ED. JOURN. BOT.]

"authority," from ed. i. of that work. To quote Watson's own words: "Better is it—over and over again I would repeat,—far better is it to overlook and ignore a hundred alleged facts, if only five or ten of them are likely to be bad, to be false and misleading, although the other ninety may perchance be sound and valuable. If the vitiating grains cannot be winnowed out, must remain for a time undistinguishable, let the whole be rejected. The author of a local flora, the reporting secretary of a provincial society, the editor of a fact-recording journal who allows his work to be adulterated by the errors of incompetent contributors, is so far giving the stamp of his own authority to what is worse than valueless."

In addition to the main part of the county, which I may term Flintshire proper, there are two detached portions, the larger being geographically in Shropshire, and the smaller situate in Denbighshire. Although politically both are regarded as constituting part of the county of Flint, I confine myself in the Flora to the natural division, or Flint proper, *i. e.* v.-c. 51. It had been my intention to give some ecological notes, together with a short physico-botanical account of the county, but I defer this to some future occasion. Some little investigation on the Fungi and Algæ is also omitted.

Not being resident in the county my work is necessarily considerably handicapped, and of an intermittent nature. I would take this opportunity of inviting assistance and information towards a complete Flora of Flintshire, which I hope to prepare in due course. Very much requires to be done before this is possible, and the following list is merely preliminary. I wish to express my deep indebtedness to Mr. J. A. Wheldon, F.L.S., for his kind and valuable assistance, and especially in connection with Cryptogamia; to the Rev. W. Moyle Rogers for the determination of several Rubi; and to Lord Mostyn and his agent Mr. Pickering for facilities for investigating Llyn Helyg. My thanks are also due to Mr. J. Clubb, M.Sc., Curator of the Lord Derby Museum, Liverpool, who kindly extracted several records for me from the herbarium of the late Robert Brown. Flowering plants and ferns unrecorded for Flintshire in *Topographical Botany* (or of the aforementioned nature) and new county records are indicated by an asterisk; those recorded in Top. Bot. but without the citation of any authority have a † prefixed. There is no list of hepatics, mosses, or lichens for the county, so I have not prefixed an asterisk to their names. The initials W. & D. (Wheldon and Dallman) indicate that the record rests on the joint authority; where no authority follows, I alone am responsible for such record.

Clematis Vitalba L. About the ruins of Greenfield or Maes Glas Abbey, and the old mill at the back, August, 1906.—*Thalictrum collinum* Wallr. Limestone rocks near Rhydymwyn, at about 600 ft.—**Anemone nemorosa* L.—*Ranunculus Lenormandi* F. Schultz. Near Rhydtalog; by the stream below Ysceifiog, *W. & D.*; near Rhesycae.—*R. sceleratus* L. Marsh below Rhuddlan Castle.—**R. Ficaria* L.—*R. Drouetii* Godr. Mill-race, Wern Mill, near Nannerch; stream below Ysceifiog, *W. & D.*—†*Caltha palustris* L.

†*Papaver Rhœas* L. and †*P. dubium* L. — **Chelidonium majus* L. Frequent throughout most of the county, but generally in the vicinity of houses.

**Neckeria lutea* Scop. "Naturalized on a wall about two miles North West of Mold beyond Rhual, July, 1885, Robert Brown," *Herb. Brown*; near Rhydymwyn, an escape.—†*N. claviculata* N. E. Br. Caergwrle, an old station.

**Berberis vulgaris* L. Several bushes near the summit of the Bailey Hill, Mold; doubtless planted here.

Cheiranthus Cheiri* L. In quantity on the ruins of Rhuddlan Castle. — †*Nasturtium officinale* R. Br. — *N. palustre* DC. Stream below Ysceifiog, *W. & D.* — **Arabis hirsuta* Scop. Rhydymwyn.— **Cardamine hirsuta* L. Rhydymwyn.—†*C. pratensis* L.—Erophila vulgaris* DC. Rhyl; Rhydymwyn. — **Cochlearia Armoracia* L.— *Sisymbrium Sophia* L. Rhyl. — †*S. officinale* Scop. — †*S. Alliaria* Scop.—†*Bursa Bursa-pastoris* Weber.

Reseda lutea L. About the Denbigh Cement Works near Caerwys, amid doubtful surroundings. — *R. Luteola* L. North of Bagillt; near Coed Talon.

Helianthemum marifolium Mill. "Rock below the ruins of Diserth Castle, July, 1885, R. B.," *Herb. Brown.*

Viola palustris* L. Marshy ground about three miles south-west of Nannerch.—†*V. Riviniana* Reich.—V. silvestris* Reich. "Woods by the banks of the River Alyn, about 1 mile West of Rhydymwyn, 17th May, 1877," *Herb. Brown.* — *V. hirta* L. "Limestone banks in the Leet Valley between Rhydymwyn and the Loggerheads, 25th May, 1881, R. B.," *Herb. Brown.*—*V. tricolor* L. "Weed in cultivated fields near Brithdir Mawr, east slope of Moel Fammau, 17th May, 1877, Robert Brown," *Herb. Brown.*

†*Polygala vulgaris* L.

Saponaria officinalis* L. About thirty plants close to the road, a short distance south of Caerwys; about the old mill behind Greenfield Abbey. — †*Silene Cucubalus* Wibel. Roadside near Ewloe; Cilcain. — *S. nutans* L. "Waste ground by the Lead Mines, West base of Talargoch Hill, about two miles south of Prestatyn, July, 1885, R. B.," *Herb. Brown.* — †*Lychnis dioica* L. — **L. Flos-cuculi* L. Marshy ground near Pant-gwyn-bach between Ysceifiog and Plâs Captain; Llyn Helyg. — **L. Githago* Scop. Cornfield near Bryn Ffynnon, south-west of Nannerch, August, 1906.—Cerastium glomeratum* Thuill.—†*C. triviale* Link.—**Stellaria Holostea* L.—†*S. graminea* L. — *Arenaria verna* L. Abundant in the vicinity of lead mines and old workings. — **A. trinervia* L. — **A. serpyllifolia* L., var. *β leptoclados* Guss. "Old wall between Gwaunysgeor and Bryn, towards Prestatyn, July, 1885, R. B.," *Herb. Brown*; Nannerch; Halkin.—†*Spergula arvensis* L.

**Montia fontana* L. Hope Hill, 1904; Caergwrle; damp ground above Rhesycae.

†*Hypericum perforatum* L. Walwen.—†*H. dubium* Leers. "West slope of Coed-yr-Esgob, about 1½ miles south of Prestatyn, 24th August, 1885, R. B.," *Herb. Brown*; a common plant in many parts of the county, especially on limestone. — **H. humifusum* L.

Maes Mynan; near Nannerch. — **H. Androsæmum* L. "Wooded steep banks of Nant-y-Flint, 1½ miles inland of Flint, 30th August, 1894, R. B.," *Herb. Brown.* — *H. hirsutum* L. "Slope of Coed-yr-Esgob, about two miles south of Prestatyn, July, 1885, R. B.," *Herb. Brown.* — *H. montanum* L. "Slope of Coed-yr-Esgob, about two miles south of Prestatyn, July, 1885, R. B.," *Herb. Brown.*

Malva moschata L. Near Nannerch; Cilcain; Mostyn; Rhuddlan; Caergwrle.—†*M. sylvestris* L.

**Tilia vulgaris* Hayne.

**Radiola linoides* Roth. Damp gravelly ground near the boathouse at the east end of Llyn Helyg, here, as in Carnarvonshire and elsewhere, growing in company with *Centunculus*, altitude 600 ft., August, 1906, *W. & D.* — **Linum usitatissimum* L. A weed in a cornfield south-west of Nannerch, September, 1906. — †*L. catharticum* L.

†*Geranium sanguineum* L. "Abundant on the West slope of Coed-yr-Esgob, about 1½ miles south of Prestatyn, July, 1885," *Herb. Brown*; on limestone rocks in the Leet, between Rhydymwyn and the Loggerheads, an old station. — †*G. pratense* L. Near Cilcain.—†*G. pusillum* L. "Near the highest point of Talargoch Hill, about 3 miles south of Prestatyn, July, 1885," *Herb. Brown.* — †*G. dissectum* L. Among slag in the hollow above the brickworks above Coed Talon, 1905; roadside near Wern Mill, near Nannerch.—†*G. lucidum* L. — †*G. Robertianum* L. — †*G. molle* L. — †*Erodium cicutarium* L'Hérit.—*E. maritimum* L'Hérit. "Sandy hedge cop in narrow lane leading from Ty-Newydd farm to the sea shore, a short distance east of Rhyl, July, 1885, Robert Brown," *Herb. Brown.*—**Oxalis Acetosella* L.

†*Ilex Aquifolium* L. I should consider this wild in some parts of the county, especially the mountainous portion.

Acer Pseudo-platanus* L.—A. campestre* L. In quantity in Wared Wood about one and half miles south-east of Northop; Caergwrle; several trees in hedge near Plâs Yw.

Ulex Gallii* Planch. A striking feature of the hill vegetation in several places, particularly about the Clwydian range. — **Cytisus scoparius* Link. Near the railway between Glan-yr-Afon and Nannerch, 1906; near Gwrych Bedw, south-west of Nannerch.—Medicago sativa* L. By the railway, west of Glan-yr-Afon, 1906. — †*M. lupulina* L.—**Anthyllis Vulneraria* L. Lixwm, August, 1906; near Rhyl.—**Trifolium procumbens* L.—*T. fragiferum* L. Below Rhuddlan Castle.—**Ononis repens* L. Near Rhyl.—*O. spinosa* L. Adjoining the road just beyond the Cheshire boundary, towards Queen's Ferry, August, 1906. — **Lathyrus montanus* Bernh. Side of lane one mile north-west of Nannerch, August, 1906. — †*Vicia sylvatica* L. "West slope of Coed-yr-Esgob, about 1½ miles south of Prestatyn, July, 1885, Robert Brown," *Herb. Brown.*

**Prunus insititia* Huds. Side of lane to east of Moel Plâs Yw, altitude 900 ft., August, 1906.

**Rubus Idæus* L. Near Rhydtalog, 1905; mountain clough about one and a half miles north of Moel Arthur; near Nannerch; Rhydymwyn; Nant-y-Flint. — **R. dumetorum* W. & M. Common in

many districts; *β diversifolius* (Lindl.), Mostyn, *Moyle Rogers* in Journ. Bot. 1891. — **R. incurvatus* Bab. Above Walwen, August, 1906; *W. & D.*, v.-c. 51, is given in the *Handbook of British Rubi*, but no locality.—**R. Lindleianus* Lees. Recorded in the *Handbook* for Flint, but no authority or locality; north-west of Cilcain, *W. & D.* — **R. Silurum* A. Ley. Near Llyn Helyg, August, 1906, *W. & D.* — **R. pulcherrimus* Neum. Recorded by Rev. W. Moyle Rogers in his *Handbook*, but no locality; with the last; south-west of Rhydymwyn, *W. & D.* — **R. Griffithianus* Rogers, f. *umbrosa*. Near Llyn Helyg, August, 1906, *D. & W.*; first noted in Flint by Captain A. H. Wolley Dod. Regarding the Llyn Helyg plant, the Rev. W. Moyle Rogers writes:— "Gathered too late for *absolute* certainty, but quite like a shade-grown state of my *R. Griffithianus*, which I have seen from Flintshire (Nant-y-Ffrith Hill, 1903, *Wolley Dod*)." First discovered by Mr. J. E. Griffith in 1887 in Anglesey and Carnarvonshire. In the *Handbook of British Rubi* (1900) it is only recorded with certainty from three British counties—Anglesey, Carnarvonshire, and Devon. — **R. Selmeri* Lindeb. No locality cited in *Handbook*; near Llyn Helyg; near Ysceifiog, *W. & D.*; Maes Mynan; north-west of Cilcain, *W. & D.* — **R. rusticanus* Merc. The common bramble in many parts of the county; previously recorded for the county (Mostyn), Journ. Bot. 1191. — **R. Sprengelii* Weihs. No locality cited in *Handbook*; some stunted plants near Llyn Helyg, *W. & D.*, August, 1906. — **R. Bakeri* F. A. Lees. Near Llyn Helyg, *W. & D.*, August, 1906. The Rev. W. Moyle Rogers remarks of this plant:—"I have seen no other *R. Bakeri* from Flint, and this is hardly characteristic."—**R. leucostachys* Schleich. First recorded by Rev. W. Moyle Rogers; north of Ysceifiog, *W. & D.* — **R. corylifolius* Sm. (v.-c. 51, *Handbook*). Frequent. — **R. rosaceus* (aggregate). Wood skirting Llyn Helyg, altitude 600 ft., August, 1906, *W. & D.* — **R. dasyphyllus* Rogers (v.-c. 51, *Handbook*). With the last; roadside between Nannerch and Rhydymwyn, *W. & D.*—**R. cæsius* L. Between Rhyl and Prestatyn; Rhydymwyn (v.-c. 51, *Handbook*).— **R. echinatoides* Rogers. Near Llyn Helyg, August, 1906, *W. & D.* (v.-c. 51, *Handbook*).

†*Geum urbanum* L. — **Fragaria vesca* L. — **Potentilla Fragariastrum* Ehrh.—**P. silvestris* Neck,—†*P. reptans* L.—†*P. Anserina* L.—**P. palustris* Scop. Swamp by lane near Plâs Captain, near Lixwm, August, 1906, *W. & D.*; Llyn Helyg, *W. & D.*—*P. argentea* L. "Sparingly on some low limestone rocks between Ffynnon Bueno and Tremeirchion Caves, May and August, 1886, R. B.," *Herb. Brown.* — **Alchemilla arvensis* Scop. Caergwrle Castle Hill, easily overlooked, May, 1905; Ysceifiog.—**A. vulgaris* L.—**A. vulgaris* L. c. *filicaulis* Buser. Quarry west of Whitford, *W. & D.*, August, 1906.—**Agrimonia odorata* Mill. Very fine near where the Holywell road branches from the main road, about one mile north of Nannerch Station, August, 1906. — †*A. Eupatoria* L. "West slope of Coed-yr-Esgob, about 1½ miles south of Prestatyn, July, 1885," *Herb. Brown.*—*Rosa spinosissima* L. Frequent on the limestone. — *R. mollis* Sm., *W. & D.*— †*R. tomentosa* Sm. Rhydymwyn, *W. & D.* — **R. dumalis* Beichst. Rhydymwyn, 1906,

W. & D.—**R. urbica* Leman, *W. & D.*—**R. glauca* Vill. *β subcristata* Lane near Llyn Helyg, August, 1906, *W. & D.*—†*R. arvensis* Huds. —**Pyrus Aucuparia* Ehrh. Very fine on the east side of Moel Plâs Yw, altitude 900–1000 ft.; Caergwrle, 1903.—†*P. Malus* L.—**P. Malus* L. *β mitis* Wallr., 1905.—**Cratægus monogyna* Jacq. The common form.

**Saxifraga tridactylites* L. — **Chrysosplenium oppositifolium* L. Common.—†*C. alternifolium* L.—*Parnassia palustris* L. Apparently scarce in this county; three plants by roadside between the Cheshire boundary and Queen's Ferry; a few plants near Sarn Mill, south of Ysceifiog; sparingly in marshy land near the streamlet west of the road leading from the Mold road to Lixwm.

Ribes Grossularia* L. Frequent.—R. rubrum* L. Two bushes, apparently indigenous, south-west of Rhydymwyn, August, 1906.—**R. nigrum* L. Near Walwen, an escape.

Cotyledon Umbilicus* L. Near Caergwrle on millstone grit, 1903. —Sedum rupestre* L. "Rocks in the valley of the River Alyn, about 3 miles west of Mold, Sept. 18th, 1873," *Herb. Brown*; still there, 1906. — **S. reflexum* L. "Naturalized on wall and hedge-bank near Pwll-y-bont in a lane leading from Meliden to the sea-shore, August, 1886," *Herb. Brown*; on old stones by a ruined cottage in the valley north of Ysceifiog, *W. & D.*; naturalized in quantity on walls about a farm by the roadside, a mile or so south-west of Nannerch.—†*S. acre* L.—**Sempervivum tectorum* L.

**Drosera rotundifolia* L. A remarkably scarce plant in Flintshire apparently, doubtless on account of its calciphobous nature. In swampy ground by the clough above Bryn Ffynnon, about a quarter or a third of a mile above the rifle target, September, 1906.

**Epilobium angustifolium* L. In fair amount in a small dell or excavation in the wood almost facing Nannerch Station, at the point marked Wal-goch on the Ordnance Map, September, 1906.—†*E. hirsutum* L. — †*E. montanum* L. — †*E. palustre* L.—†*Circæa lutetiana* L. In most of the woods.

Bryonia dioica Jacq. Rather uncommon; two or three plants in hedge on right of road from Cymmau to Caergwrle, near the latter place, 1904; in a hedge just off the road from Bagillt to Halkin, near the former place, 1906.

Hydrocotyle vulgaris* L. — **Sanicula europæa* L. — **Conium maculatum* L. Near Prestatyn, 1906; about Greenfield Abbey; Rhydymwyn. — *Apium graveolens* L. Marsh about Rhuddlan Castle. — †*A. nodiflorum* Reichb. fil. — **A. inundatum* Reichb. fil. Mud in shallow watercourse running under road between the Cheshire boundary and the railway before reaching Queen's Ferry, 1905; Pant-yr-Gof; Llyn Helyg. — *Sison Amomum* L. Roadside east of Rhyl; in fair quantity along the roadside one mile north-east of Queen's Ferry; a few plants between Queen's Ferry and Ewloe, by the roadside about half a mile past the junction with the Hawarden road. — **Ægopodium Podagraria* L. Holywell; Rhydymwyn; Pen-y-Fford; Nannerch.—†*Pimpinella Saxifraga* L. Frequent on the limestone.—Conopodium denudatum* Koch. Hope, 1904; Caergwrle. — **Myrrhis odorata* Scop. Near Cilcain; in

quantity on the Caergwrle side of Hope Hill. — †*Chærophyllum temulum* L.—†*Anthriscus sylvestris* Hoffm.—†*Fœniculum vulgare* Mill. "Abundant in lane leading from Meliden to Pwll-y-bont, about 1½ miles south-west of Prestatyn, July, 1885," *Herb. Brown*; Rhyl; Mold; Bagillt. — †*Œnanthe fistulosa* L. Ditches east of Rhyl.—**O. Lachenalii* C. Gmel. Rhuddlan, 1906; between Rhyl and Prestatyn.—**Silaus flavescens* Bernh. Roadside south of St. Asaph near the county boundary, and extending into Denbighshire, August, 1906, altitude 180 ft.; roadside between Rhyl and Meliden. —†*Angelica sylvestris* L. — †*Heracleum Sphondylium* L. — †*Daucus Carota* L.—**Caucalis Anthriscus* Huds.—*C. nodosa* Scop. "Among the limestone rocks in Nant-yr-Ogof, about 2 miles south of Prestatyn, July, 1885," *Herb. Brown.*—**C. arvensis* Huds. "Cornfields between Prestatyn and Meliden, west of the highroad, July, 1885," *Herb. Brown.*

†*Hedera Helix* L.—*Adoxa Moschatellina* L.

Cornus sanguinea L. In fair quantity in the hedgerow on the left side of the lane between Ysceifiog and Lixwm; near Nannerch; wood on left-hand side of the road between the Denbigh Cement Works and Caerwys; Maes Mynan.

Sambucus nigra* L.—S. Ebulus* L. Naturalized near Rhydymwyn, an old station. — **Viburnum Opulus* L. Pont Bleiddyn, 1905; near Cefn-y-Bedd; Nant-y-Flint; near Nannerch; Rhydymwyn.—†*Lonicera Periclymenum* L.

†*Galium verum* L.—†*G. Cruciata* Scop.—†*G. saxatile* L.—†*G. palustre* L.—†*G. Aparine* L.—†*Asperula odorata* L. — †*Sherardia arvensis* L.

Valeriana dioica* L. Marshy woodland on right-hand of the road between Cefn-y-Bedd and Ffrith, 1905, altitude 300 ft. — †*V. sambucifolia* Willd.—Centranthus ruber* DC. "Naturalized about Meliden, especially in lane leading to Pwll-y-bont, July, 1885," *Herb. Brown.*—†*Valerianella olitoria* Poll. About Cymmau.

†*Scabiosa succisa* L.—**S. Columbaria* L. "Rocky ground between Nant-yr-Ogof and Talargoch Hill, about 2 miles South of Prestatyn, 24th August, 1885," *Herb. Brown*; Rhydymwyn; Lixwm; Caerwys. —†*S. arvensis* L.

†*Eupatorium cannabinum* L. Very fine near Greenfield Abbey.—†*Solidago Virgaurea* L. "Hedge-bank between Caerwys Railway Station and the town, August, 1886," *Herb. Brown.*—†*Aster Tripolium* L. Muddy shore of the Dee by Queen's Ferry, 1903; marsh below Rhuddlan Castle, August, 1906. — *Erigeron acre* L. "West slope of Coed-yr-Esgob, about 1¼ miles south of Prestatyn, July, 1885," *Herb. Brown*; near Ffrith; hedge-bank between Caerwys Railway Station and the town; on colliery refuse about three-quarters of a mile south-west of Cefn-y-Bedd Railway Station.—†*Gnaphalium uliginosum* L.—**Inula Helenium* L. In a suspicious situation, Cilcain, August, 1906.—*I. Conyza* DC. Near Caerwys; south-west of Rhydymwyn. — **Ambrosia artemisiæfolia* L. This alien was growing in considerable quantity about the mill behind Greenfield Abbey in 1906.—†*Matricaria inodora* L. "Grassy lane about 1½ miles south-east of Rhyl, near a farm called Tre-llewelyn,

July, 1874, Robert Brown," *Herb. Brown.*—†*Achillea Ptarmica* L. Cornfield near Bryn Ffynnon.—*Tanacetum vulgare* L. Entered as non-indigenous in Top. Bot. Banks about Queen's Ferry; extending for some distance along hedges on the north side of the valley above Ysceifiog; field by roadside near Tan-yr-Allt, near Llyn Helyg; on the Halkin road near Bagillt; roadside near Ddol, below Ysceifiog; probably indigenous in some of these stations.—**Artemisia Absinthium* L. "West bank of the River Elwy, about one mile below St. Asaph, Flintshire; possibly introduced; September, 1887," *Herb. Brown*; Lixwm.—†*A. vulgaris* L.—†*Tussilago Farfara* L.—†*Petasites officinalis* Mœnch. "Banks of the River Alyn, Rhydymwyn, 17th May, 1877, Robert Brown," *Herb. Brown.*—**P. albus* Gaertn. "Flourishes in a large patch on some waste land near the road between Mostyn and Ffynnon Groew, and flowers freely in the early spring. It is difficult to surmise how it got located in this present home," *R. Brown*, 1898.—†*Senecio vulgaris* L.—†*S. sylvaticus* L.—†*S. Jacobæa* L.—†*S. aquaticus* Huds.—*S. erucifolius* L. Near Queen's Ferry; St. Asaph; near Llyn Helyg.—**Carlina vulgaris* L. Frequent on the hills; Lixwm; near Ffrith; Rhydymwyn; Moel Famma; Moel Arthur, 1050 ft.; above Rhesycae; Halkin Mountain. — *Carduus nutans* L. Lixwm; Caerwys.—†*C. crispus* L.—†*Cnicus lanceolatus* Willd.—†*C. palustris* Willd.—†*C. arvensis* Hoff.—*Serratula tinctoria* L. "Hedge-banks—scattered at intervals between St. Asaph and Cwm, after passing Brynhyfryd, September, 1887, R. Brown," *Herb. Brown*; several plants on a hedge-bank north of Caerwys, *W. & D.* — †*Centaurea nigra* L.—**C. Scabiosa* L. Frequent in many places; "Hedge-banks around Prestatyn, 24 August, 1885, Robert Brown," *Herb. Brown*; Rhyl; Caerwys; St. Asaph; Rhydymwyn; Lixwm; Nannerch; near Halkin.—†*C. Cyanus* L. "Field of beans by the footpath from the centre of Prestatyn, a short distance towards Rhyl, July, 1885," *Herb. Brown.*—**Cichorium Intybus* L. "Weed in a field of oats near Brithdir Mawr on the east slope of Moel Fammau, August, 1889, Robert Brown," *Herb. Brown.*—†*Lapsana communis* L.—*Picris echioides* L. By a hedge, on clayey soil, north of and parallel with the railway about half-way between Rhyl and Prestatyn, August, 1906, *Rev. T. J. Walshe & A. A. D.*— †*Crepis virens* L.—**C. paludosa* Mœnch. Nant-y-Flint, "on damp ground above the old mill-race," *R. Brown*, 1894. — **Hieracium vulgatum* Fr. (Agg.). Rhydymwyn; north-east of Caerwys, *W. & D.*.—†*H. Pilosella* L.—†*H. boreale* Fr. (Agg.).—†*Leontodon autumnalis* L.—*L. hirtus* L. "Waste sandy ground between Prestatyn Railway Station and the sea, July, 1885, Robert Brown," *Herb. Brown.*—*L. hispidus* L. "West slope of Coed-yr-Esgob, about 1½ miles south of Prestatyn, July, 1885, Robert Brown," *Herb. Brown.*—†*Taraxacum Dens-leonis* Desf. — **T. erythrospermum* Andrz. Rhyl, 1906.—**Lactuca muralis* Fresen. Pont Bleiddyn; near Hawarden; Rhydymwyn; Nannerch; Holywell; Cefn-y-Bedd. — †*Sonchus oleraceus* L.—†*S. arvensis* L. "Cornfield, Rhyl, July, 1873, R. Brown," *Herb. Brown.* —**Tragopogon pratense* L. Near Rhyl,

1906; about three-quarters of a mile south-west of Cefn-y-Bedd Railway Station.

†*Jasione montana* L.—**Wahlenbergia hederacea* Reichb. Marshy ground by a streamlet on west side of the road to Llandyrnog, about three miles south-west of Nannerch, the Denbigh border being close by, altitude 900 ft., August, 1906.—**Campanula Trachelium* L. Near Caerwys, scattered along the hedgeside of a field lying between the road and Pandy Woollen Mills, August, 1906.—**C. latifolia* L. Maes Mynan; north-east of Caerwys, *W. & D.*; one of the few old Flint records, being mentioned in Gough's *Camden's Britannia* (1789) as growing "near Holywell."—†*C. rotundifolia* L.

†*Vaccinium Myrtillus* L.—†*Calluna Erica* DC.—†*Erica Tetralix* L.—†*E. cinerea* L.

†*Armeria maritima* Willd.

†*Primula acaulis* L.—**P. acaulis* L. × *P. veris* L. Caergwrle, both parents being close by, 1904.—†*Lysimachia nemorum* L.—†*Glaux maritima* L.—†*Anagallis arvensis* L.—†*A. tenella* L. About three miles south-west of Cilcain, in company with Wahlenbergia; shore of Llyn Helyg; above Bryn Ffynnon.—**Centunculus minimus* L. Damp gravelly ground bordering Llyn Helyg, altitude 600 ft., September, 1906.

†*Fraxinus excelsior* L.

†*Erythræa Centaurium* Pers.—†*Gentiana Amarella* L. Lixwm; Halkin; Caerwys; Whitford.—†*G. campestris* L. Less frequent than the last; near the road to the east of Glol.—†*Menyanthes trifoliata* L. Swamp by lane near Plâs Captain, near Lixwm, August, 1906, *W. & D.*; swampy ground in field a little distance south-west of Nannerch.

Cynoglossum officinale* L. Rhyl, August, 1906.—Symphytum officinale* L. Damp field opposite the mill at Cefn-y-Bedd, 1904; railway-bank north of Buckley Station; waste ground near Mold Railway Station.—**Borago officinalis* L. "Apparently naturalized on the west bank of the River Elwy, ¼ mile north of St. Asaph, R. B., August, 1873," *Herb. Brown.*—†*Lycopsis arvensis* L.—**Anchusa sempervirens* L. Still occurs on the ruins of Greenfield Abbey, whence it was originally erroneously recorded as *Pulmonaria angustifolia*; Maes Glâs and Basingwerk are other names of this Abbey; near Holywell.—**Myosotis sylvatica* Hoffm. Woods near Rhydymwyn.—†*M. cæspitosa* F. Schultz.—†*M. arvensis* Lam.—†*M. versicolor* Reichb.—*Lithospermum arvense* L. "Cornfield near Rhyl, July, 1873, R. B.," *Herb. Brown.*

†*Volvulus sepium* Junger.—†*Convolvulus arvensis* L.

†*Solanum Dulcamara* L.—**Lycium chinense* Mill. Naturalized near Queen's Ferry and elsewhere along the coast.

Verbascum Thapsus L. Near Nannerch; Mostyn; Rhydymwyn; Ffrith; about three-quarters of a mile south-west of Cefn-y-Bedd Railway Station.—**Linaria Cymbalaria* Mill. Near Cefn-y-Bedd, 1904; Holywell; in quantity on a wall by the roadside between Pen-y-Fford Railway Station and Pont Bleiddyn, about a mile from the former place, 1905; extending for some distance along the stone hedge-bank between Ysceifiog Church and end of the lane to

Lixwm; on a wall between the Railway Station and the Market Hall at Mold.—*L. viscida* Mœnch. "West bank of the River Elwy, about one-fourth of the distance between St. Asaph and Rhuddlan, August, 1887, R. B.," *Herb. Brown.*—**Antirrhinum majus* L. On the ruins of Greenfield Abbey, August, 1906.—†*Scrophularia nodosa* L.—†*Digitalis purpurea* L.—*Veronica Tournefortii* C. Gmel. Still near Mold Railway Station, 1906; roadside near Nannerch.—†*V. hederæfolia* L.—†*V. arvensis* L.—†*V. serpyllifolia* L.—†*V. officinalis* L.—†*V. Chamædrys* L. — †*V. montana* L.—†*V. scutellata* L.—†*V. Anagallis-aquatica* L.—†*V. Beccabunga* L.—†*Euphrasia officinalis* L. —**E. nemoralis* H. Mart. Frequent, *W. & D.*—†*Bartsia Odontites* Huds.—†*Pedicularis palustris* L. and †*P. sylvatica* L.—†*Rhinanthus Crista-galli* L.—†*Melampyrum pratense* L. "Slope of Coed-yr-Esgob, about 1½ miles south of Prestatyn, 24th August, 1885, R. B.," *Herb. Brown*; roadside about half a mile east of Cilcain, altitude about 550 ft., *W. & D.*

**Pinguicula vulgaris* L. Apparently rather scarce and local in Flint; rill north-west of Cilcain, near Moel Llys-y-coed, 1000–1100 ft., August, 1906, *W. & D.*; swampy ground near the stream above Bryn Ffynnon.

**Verbena officinalis* L. In a small quarry or excavation near the road, a short distance south of Caerwys, August, 1906; lane by smithy by the road, about three-quarters of a mile south-east of Pandy Paper Mills, near Caerwys.

Mentha piperita* L. Dry bed of the River Alyn, a short distance south of where it crosses the Cilcain road, altitude 400–500 ft., August, 1906; by the stream north of Ysceifiog, at about 350 ft., August, 1906, *W. & D.*—†*M. hirsuta* Huds.—M. sativa* L. Marshy ground skirting Llyn Helyg, August, 1906, altitude 600 ft., *W. & D.*; moist ground in wood south-east of Rhydymwyn Railway Station, altitude 415 ft. — †*M. arvensis* L. Cornfield above Bryn Ffynnon, altitude about 700 ft.—**Origanum vulgare* L. "Abundant on the west slope of Coed-yr-Esgob, one to two miles south of Prestatyn, August, 1885, R. B.," *Herb. Brown*; frequent on the limestone; on the left side of the lane between Ysceifiog and Lixwm; about the Denbigh Cement Works and onward to Caerwys; Maes Mynan, south-west of Rhydymwyn; in quantity about the Hendre Mine and Quarry, Clan-yr-Afon, near Rhydymwyn.—†*Thymus Serpyllum* Fr.—**Salvia Verbenaca* L. "Among the ruins of Rhuddlan Castle, July, 1873, R. B.," *Herb. Brown*; still there in quantity, 1906.—†*Nepeta Glechoma* Benth.—**Scutellaria minor* Huds. Small swamp north-east of Moel Llys-y-Coed, altitude 950–1000 ft., August, 1906, *W. & D.*—†*Prunella vulgaris* L.—*Ballota nigra* L. Ruins of Greenfield Abbey. — †*Teucrium Scorodonia* L. — *Marrubium vulgare* L. "Abundant among the ruins of Diserth Castle, and on the adjacent rock, nearly 3 miles south of Prestatyn, July, 1885, R. B.," *Herb. Brown*; about some cottages near the shore, about half-way between Rhyl and Prestatyn.—†*Stachys palustris* L.—†*S. sylvatica* L.—†*S. arvensis* L.—**Galeopsis angustifolia* Ehrh. Several plants on some waste land near Rhyl, August, 1906; this is probably the "Galeopsis Ladanum" recorded for Flint by Miss Atwood in Top. Bot.—

G. versicolor* Curt. Cornfield above Bryn Ffynnon, altitude 700 ft., August, 1906; also noticed in several other stations.—†*G. Tetrahit* L.—Leonurus Cardiaca* L. "Narrow lane crossing the railway towards Rhyd-y-ddaudwr, between Rhuddlan and St. Asaph. Many plants, but doubtless originally of garden origin, August, 1887, R. B.," *Herb. Braun*; two plants by a cottage near Ysceifiog, subspontaneous, August, 1906, *W. & D.*—**Lamium maculatum* L. Near Rhydymwyn, 1905.—†*L. purpureum* L.—†*L. album* L.—*L. Galeobdolon* Crantz. "Wood on the banks of the River Alyn, about ⅓ mile west of Rhydymwyn Railway Station, May 25th, 1874, R. Brown," *Herb. Brown*; locally abundant; wood on Hope Hill.—†*Ajuga reptans* L.

†*Plantago maritima* L. "Salt-marsh near the mouth of the River Elwy by Foryd, Rhyl, September, 1887, R. B.," *Herb. Brown.*—†*P. major* L.—†*P. lanceolata* L.—†*P. Coronopus* L.—**Littorella juncea* Berg. Shore and bed of Llyn Helyg in quantity, altitude 600 ft., August, 1906, *W. & D.*

Chenopodium Bonus-Henricus L. Frequent, but always near houses.—†*C. album* L.—**Atriplex portulacoides* L. "Salt-marsh near the mouth of the River Elwy by Foryd, Rhyl, August, 1887, R. B.," *Herb. Brown.*—†*A. patula* L.—†*A. hastata* L.—†*Salicornia herbacea* L. "Salt-marsh at the mouth of the River Elwy west of Rhyl, August, 1887, R. B.," *Herb. Brown.*

Polygonum Bistorta* L. Near Caergwrle, altitude 330 ft., 1904.—†*P. Convolvulus* L.—†*P. aviculare* L.—†*P. Hydropiper* L.—†*P. Persicaria* L.—†*P. amphibium* L.—P. amphibium* L. β *terrestre* Leers. Frequent.—**Rumex sanguineus* L. β *viridis* Sibth. Nant-y-Flint.—†*R. conglomeratus* Murr.—†*R. obtusifolius* L.—†*R. crispus* L.—†*R. Acetosa* L.—†*R. Acetosella* L.

**Ulmus montana* Stokes.—†*U. suberosa* Ehrh.

†*Mercurialis perennis* L.

Humulus Lupulus L. Hedge between Hawarden and Broughton Hall Railway Station; hedge near Cefn-y-Bedd; roadside about half a mile north of Nannerch Railway Station; hedges between Flint and Bagillt.—†*Urtica dioica* L.—†*U. urens* L.—†*Parietaria officinalis* L. "Hedge-bank in lane leading from Meliden to Pwll-y-bont, about 1½ miles south-west of Prestatyn, July, 1885, R. B.," *Herb. Brown*; Flint; Cymmau; Lixwm; Caergwrle.

Betula alba* L. Hope Hill, 1903; about Llyn Helyg; swamp by lane near Plâs Captain, near Lixwm.—†*Alnus glutinosa* Medic.—†*Corylus Avellana* L.—*Quercus Robur* L. α **pedunculata* Ehrh.—γ **sessiliflora* Salisb.—Castanea sativa* Mill.—**Fagus sylvatica* L.

Salix pentandra* L. Swampy ground by lane near Plâs Captain, near Lixwm, altitude about 600 ft., 1906, *W. & D.*—S. alba* L. Nant-y-Flint, 1906.—*S. aurita* L. Frequent.—†*S. cinerea* L.—**S. aurita* L. × *S. Caprea* L. Swampy ground by lane near Plâs Captain, near Lixwm, 1906, *W. & D.*—**S. aurita* L. × *S. cinerea* L. With the last.—**S. Caprea* L. Frequent.—*S. repens* L. In limited quantity on the south shore of Llyn Helyg, *W. & D.*—†*Populus tremula* L. Apparently rather scarce; two trees in

the hedge on the roadside just out of Caerwys towards Croes Waen.

Taxus baccata* L. A single tree about one hundred yards above the road on the east slope of Moel Plâs Yw, just beyond the turning to Plâs Yw, altitude 900 ft.—Elodea canadensis* Michx. "Shallow pond about ¼ mile north of St. Asaph, between the River Elwy and the high-road by Gwern-eigron and Plâs coch, August, 1886," *Herb. Brown.*

†*Listera ovata* R. Br. The Leet.—*Epipactis latifolia* All. Wood skirting Llyn Helyg, *W. & D.*—*E. atrorubens* Schultz. This rare species was discovered by Mr. Wheldon and myself in a second Flint station sparingly on limestone. I refrain from stating the locality.—†*Orchis mascula* L.—†*O. maculata* L.—†*O. latifolia* L. Swampy ground by lane near Plâs Captain, *W. & D.*—†*Habenaria viridis* R. Br. "Waste hilly ground in the Leet Valley between Rhydymwyn and the Loggerheads, Flintshire, May 25th, 1881, R. B.," *Herb. Brown.* Still there, 1905.

†*Iris Pseudacorus* L.

Tamus communis L. Common.

**Allium ursinum* L.—†*Scilla festalis* Salisb.—†*Narthecium Ossifragum* Huds. Very local; above Bryn Ffynnon.—†*Paris quadrifolia* L. Rhydymwyn.

†*Juncus bufonius* L.—†*J. squarrosus* L.—†*J. glaucus* Leers.—†*J. effusus* L.—†*J. conglomeratus* L.—†*J. lamprocarpus* Ehrh.—†*Luzula campestris* DC.

†*Typha latifolia* L. — †*Sparganium ramosum* Huds. — †*S. simplex* Huds.

†*Arum maculatum* L.—†*Lemna minor* L.—†*L. gibba* L.

†*Alisma Plantago-aquatica* L.—†*Triglochin palustre* L.—†*T. maritimum* L.

†*Potamogeton polygonifolius* Pour. Moist places south-west of Nannerch towards the Denbigh border.—†*P. pusillus* L.

†*Eleocharis palustris* R. Br. Near Rhyl; Llyn Helyg.—**Scirpus maritimus* L. *β compactus* Koch. Ditch between Rhyl and Prestatyn, 1906, *Rev. T. J. Walshe & A. A. D.*—†*S. cæspitosus* L.—†*Eriophorum angustifolium* Roth. — †*Carex rostrata* Stokes. Swamp near Plâs Captain, *W. & D.* — †*C. pulicaris* L. — †*C. arenaria* L. Rhyl; Queen's Ferry; Prestatyn. — †*C. vulpina* L. — †*C. Goodenowii* J. Gay.—**C. Pseudo-cyperus* L. Llyn Helyg.—†*C. flacca* Schreb. —**C. pilulifera* L. Locally common; north-west of Cilcain; Llyn Helyg, *W. & D.*; Moel Arthur. — †*C. panicea* L. — **C. pendula* Huds. "Banks of the stream a short distance above Garth Mill, Llinegar, Ffynnon groow, near Mostyn, R. B., May 21st, 1886," *Herb. Brown.*—*C. Œderi* Retz. In small amount on the south shore of Llyn Helyg, *W. & D.*—†*C. hirta* L.—*C. divisa* Huds. "Marshy pastures by the railway immediately west of Prestatyn, July, 1885, R. B.," *Herb. Brown.*— *C. remota* L. Maes Mynan, by the stream.

†*Phalaris arundinacea* L.—†*Anthoxanthum odoratum* L.—†*Alopecurus geniculatus* L.—†*A. pratensis* L.—**Milium effusum* L. Rhydymwyn.—†*Phleum pratense* L.—†*Agrostis canina* L.—†*A. vulgaris*

With.—†*Ammophila arundinacea* Host.—†*Aira caryophyllea* L.—†*A. præcox* L.—†*Deschampsia cæspitosa* Beauv.—†*D. flexuosa* Trin.—†*Holcus lanatus* L.—†*Trisetum pratense* Pers.—†*Arrhenatherum avenaceum* Beauv.—†*Sieglingia decumbens* Bernh.—†*Phragmites communis* Trin.—†*Cynosurus cristatus* L.—†*Molinia varia* Schrank.—**Melica uniflora* Retz. Hope; Caergwrle.—†*Dactylis glomerata* L.—†*Poa annua* L.—†*P. pratensis* L.—†*P. trivialis* L.—†*Glyceria fluitans* R. Br.—**Festuca rigida* Kunth.—†*F. ovina* L.—**Bromus unioloides* H. B. K. Several plants of this alien on some waste ground near Flint, 1905.—†*B. giganteus* L.—†*B. mollis* L.—**B. sterilis* L.—**Agropyron caninum* Beauv.—†*A. repens* Beauv.—†*Brachypodium gracile* Beauv.—†*Lolium perenne* L.

†*Pteris aquilina* L.—†*Lomaria Spicant* Desv.—†*Scolopendrium vulgare* Symons.—**Polystichum lobatum* Presl. Pont Bleiddyn, 1905; occurs in many other localities.—†*Polypodium vulgare* L.—†*Asplenium Trichomanes* L.—†*A. Adiantum-nigrum* L.—†*A. Ruta-muraria* L.—**Ceterach officinarum* Willd. Wall near Nannerch, 1906.—†*Lastræa Filix-mas* Presl.

**Equisetum maximum* Lam. Pont Bleiddyn; Mostyn; Caergwrle.—†*E. arvense* L.—*E. limosum* Sm. Llyn Helyg; swamp near Plâs Captain; Pant-yr-Gof; near Mostyn Hall.

**Isoëtes lacustris* L. In quantity on the bottom of Llyn Helyg, altitude 600 ft., 1906. This lake, though of considerable extent, does not exceed six feet in depth at any point. The Quillwort and *Littorella* together form a vast carpet covering acres of the bed of the llyn. The lake is surrounded by fir-woods and it is curious that so prolific and interesting a spot should never have been previously visited by any botanist. This is the only sheet of fresh water of any extent in the county.

**Pilularia globulifera* L. In fair amount about the north-east margin of Llyn Helyg, fruiting abundantly, altitude 600 ft., August, 1906, *W. & D.* This is a very acceptable addition to the flora, and especially so as I am afraid it must have long been extinct in the old station recorded in Withering.

**Chara vulgaris* L. Cefn-y-Bedd; Rhydymwyn; near Buckley.

Hepaticæ.

Marchantia polymorpha L.—*Conocephalus conicus* L.—*Lunularia cruciata* L. Rhydymwyn; Pont Bleiddyn.—*Aneura multifida* L.—*A. pinguis* L.

Pellia epiphylla L.

Madotheca platyphylla L. On limestone rocks in the Leet.—*Frullania dilatata* L., *W. & D.*—*Diplophyllum albicans* L.—*Scapania purpurascens* Hook. Damp ground above Bryn Ffynnon; swampy ground north-west of Cilcain, altitude about 1000 ft., *W. & D.*—*S. undulata* L.—*S. irrigua* Nees. South shore of Llyn Helyg, *W. & D.*—*Plagiochila asplenoides* L.—*P. Dillenii* Tayl. Rhydymwyn, *W. & D.*—*Lophocolea bidentata* L.—*L. heterophylla* Schrad., *W. & D.*—*Alicularia scalaris* Schrad.—*Chiloscyphus polyanthos* L.—*Kantia Trichomanis* L.—*Odontoschisma sphagni* Dicks.

Musci.

Sphagnum rubellum Russ. — *S. subnitens* Russ. & Warns. — *S. acutifolium* Russ. & Warns. — *S. papillosum* Lindb. — *S. rufescens* Warns. Shore of Llyn Helyg, *W. & D.*—*S. cuspidatum* Ehrh. Llyn Helyg, *W. & D.*

Tetraphis pellucida Hedw. Fruiting sparingly near Caergwrle, 1904. — *Catherinea undulata* W. & M. — *Polytrichum commune* L. — *P. formosum* Hedw. — *P. juniperinum* Willd. — *P. aloides* Hedw. — *P. piliferum* Schreb. Moel Arthur.

Ditrichum flexicaule Hamp. In the Leet, *W. & D.*—*Ceratodon purpureus* Brid. — *Dichodontium pellucidum* Schimp. — *Dicranella varia* Schimp., *W. & D.* — *D. heteromalla* Schimp. — *Dicranoweissia cirrata* Lindb., *W. & D.* — *Campylopus flexuosus* Brid. Near Llyn Helyg, *W. & D.*—*Dicranum scoparium* Hedw.—*D. scoparium* Hedw. var. *orthophyllum* Brid. Plentiful in the Leet and elsewhere.—*D. majus* Turn. — *Leucobryum glaucum* Schimp. — *Fissidens bryoides* Hedw.—*F. adiantoides* Hedw., *W. & D.*—*F. exilis* Hedw. On clay at Rhydymwyn, 1905. — *F. taxifolius* Hedw. Pont Bleiddyn; Rhydymwyn.

Grimmia apocarpa Hedw.—*G. pulvinata* Smith.—*Tortula muralis* Hedw.—*T. intermedia* Berk. Plentiful on rocks and walls, *D. & W.* —*T. subulata* Hedw.—*T. lævipila* Schwaeg.—*Weissia viridula* Hedw., *W. & D.* — *Barbula rubella* Mitt. — *B. fallax* Hedw., *W. & D.* — *B. rigidula* Mitt., *W. & D.* — *B. vinealis* Brid. — *B. convoluta* Hedw., *W. & D.* — *B. sinuosa* Braithw. Rhydymwyn, *W. & D.* — *Trichostomum tortuosum* Dixon. Glol, *W. & D.*

Encalypta streptocarpa Hedw. Very common on the limestone rocks and walls.—*Ulota Bruchii* Hornsch. On an elder near Llyn Helyg, *W. & D.* — *Orthotrichum diaphanum* Schrad. — *O. Lyelli* Hook. & Tayl. On oak-trunks near Nannerch, *W. & D.* — *O. rupestre* Schleich. Rocks near Rhydymwyn. — *O. affine* Schrad. —*O. stramineum* Hornsch. On a stone gate-post near Lixwm, *W. & D.*

Funaria hygrometrica Sibth.—*Aulacomnion androgynum* Schwaeg. Bryn Yorkin, near Caergwrle. — *A. palustre* Schwaeg. — *Webera nutans* Hedw. — *Bryum inclinatum* Bland. — *B. argentium* L. — *B. pallens* Sw. Shore of Llyn Helyg, *W. & D.* — *B. capillare* L.—*B. cæspiticium* L. — *B. erythrocarpum* Schwaeg., *W. & D.* — *Mnium serratum* Schrad. By rill at the south end of Hope Hill, above Cymmau, 1905.—*M. hornum* L.—*M. undulatum* L.—*M. punctatum* L.

Fontinalis antipyretica L. Very plentiful in the River Alyn, especially about Caergwrle.

Neckera crispa Hedw. — *N. complanata* Hübn. — *Porotrichum alopecurum* Mitt., *W. & D.*—*Thuidium tamariscinum* B. & S.

Climacium dendroides W. & M. Very luxuriant in the swamp near Plâs Captain, *W. & D.*; Maes Mynan.—*Camptothecium sericeum* Kindb.—*C. lutescens* B. & S.—*Brachythecium rutabulum* B. & S.—*B. velutinum* B. & S. — *B. rivulare* B. & S., *W. & D.* — *B. purum* Dixon. — *Eurhynchium prælongum* Hobk.—*E. confertum* Milde.—

E. rusciforme Milde. — *Plagiothecium denticulatum* B. & S. — *P. undulatum* B. & S. Very fine in the wood skirting Llyn Helyg, *W. & D.* — *Amblystegium serpens* B. & S. — *A. filicinum* De Not. — *A. Juratzkanum* Schimp. In the Hendre Quarry between Nannerch and Rhydymwyn, 1906, *W. & D.*

Hypnum stellatum Schreb.—*H. elodes* Spruce. Very sparingly, and confined to a limited area on the south shore of Llyn Helyg, *W. & D.* Growing in company with *Salix repens*, *Carex Œderi*, *Scapania irrigua*, *Hypnum revolvens*, and *H. scorpioides*.—*H. commutatum* Hedw., *W. & D.*—*H. stellatum* Schreb. var. *β protensum* Röhl. Bank by roadside near the Hendre Quarry, *W. & D.*—*H. revolvens* Swartz. South shore of Llyn Helyg, *W. & D.*; swampy ground above Bryn Ffynnon.—*H. exannulatum* Gümb. Shore of Llyn Helyg, intermixed with *Pilularia*, *W. & D.*—*H. exannulatum* Gümb. var. *β brachydictyon* Ren. In quantity in marshy ground by the Pant-yr-Gof lead mine.—*H. revolvens* Swartz. Above Bryn Ffynnon; south shore of Llyn Helyg, *W. & D.* — *H. cupressiforme* L. — *H. cupressiforme* L. var. *ζ ericetorum* B. & S.—*H. cuspidatum* L.—*H. cordifolium* Hedw. Very fine, and fruiting plentifully in the swamp by Plâs Captain, *W. & D.*—*H. Patientiæ* Lindb. In a damp spot in the Hendre Quarry, *W. & D.*—*H. molluscum* Hedw.—*H. scorpioides* L. Above Bryn Ffynnon in considerable quantity; sparingly on the south shore of Llyn Helyg, *W. & D.* — *H. Schreberi* Willd. Llyn Helyg, *W. & D.*

Anomodon viticulosus Hook. & Tay.—*Hylocomium splendens* B. & S. —*H. squarrosum* B. & S.—*H. triquetrum* B. & S.

Lichenes.

Collema granosum Nyl. On limestone, Clan-yr-afon, near Rhydymwyn, *W. & D.*; near Cilcain, *W. & D.* — *C. pulposum* Ach. Nannerch; Rhydymwyn; near Holywell; Ffrith.—*C. granuliferum* Nyl. Quarry near Whitford; Glol, *W. & D.* — *C. melænum* Ach. On limestone, Hendre Quarry, Clan-yr-afon, *W. & D.*—*Leptogium lacerum* Gray and *L. pulvinatum* Nyl. The Leet, amongst moss, *W. & D.*

Cladonia pyxidata Fr.—*C. furcata* Hoffm. Stony ground skirting Llyn Helyg, *W. & D.* — *C. pungens* Flk. The Leet, *W. & D.*—*C. macilenta* Hoffm. Near Mostyn.—*Cladina sylvatica* Nyl. Elevated ground in the Leet, *W. & D.*

Ramalina farinacea Ach. — *R. fraxinea* Ach. Apparently less frequent than the preceding species; Llyn Helyg; Cilcain.—*Usnea hirta* Hoffm.—*U. florida* Ach.—*Platysma glaucum* Nyl. On sycamore-trunks near Llyn Helyg, altitude 600 ft., *W. & D.*—*Evernia prunastri* Ach.

Parmelia perlata Ach. Lixwm, circa 650 ft., *W. & D.* — *P. lævigata* Ach. Sparingly on the trunk of a hawthorn on Glol, altitude 700 ft., *W. & D.*—*P. saxatilis* Ach. Nannerch, *W. & D.*—*P. sulcata* Tayl. Lixwm; near Caerwys, on ash, *W. & D.*—*P. conspersa* Ach., *W. & D.* — *P. fuliginosa* Nyl. On some wooden railings by the road near Clan-yr-afon, *W. & D.*—*P. physodes* Ach.

Wall near Nannerch Station, *W. & D.* — *P. physodes* Ach. form *labrosa* Ach. Frequent. — *P. exasperata* Nyl. Near Clan-yr-afon, *W. & D.*—*P. fuliginosa* Nyl. var. *β lætevirens* Nyl. Near Coed Dû, Rhydymwyn, *W. & D.*

Solorina saccata Ach. On limestone rock in the Leet, 1904.—*Peltigera canina* Hoffm. — *P. rufescens* Hoffm. Rhydymwyn, on limestone, *W. & D.*; Cymmau; Glol. — *Physcia parietina* De Not. Frequent.—*P. stellaris* Nyl. var. *β leptalea* Nyl. On a stone gate-post near Lixwm, altitude 650 ft., *W. & D.*—*P. tenella* Nyl. Frequent.—*Pannularia nigra* Nyl. Frequent.

Lecanora sympagea Nyl. Wall near Nannerch Station, *W. & D.* —*L. vitellina* Ach. Nannerch, *W. & D.*; Caerwys; Rhydymwyn; Cilcain.—*L. citrina* Ach. Common.—*L. aurantiaca* Nyl. Nannerch, *W. & D.* — *L. galactina* Ach., *W. & D.* — *L. allophana* Nyl. On birch-trunks skirting Llyn Helyg; on tree-trunks by the Alyn below Coed Du, *W. & D.* — *L. sulphurea* Nyl. Cilcain, *W. & D.*—*L. varia* Ach. Frequent.—*L. conizæa* Nyl. On a gate near Cilcain, *W. & D.* — *L. sarcopis* Ach. With the last, *W. & D.* — *L. parella* Ach. Common.—*L. parella* Ach. var. *β Turneri* Nyl. On a sycamore-trunk near Coed Dû, Rhydymwyn, barren, *W. & D.* — *L. calcarea* Somm. Plentiful on the limestone. — *L. calcarea* Somm. var. *γ Hoffmanni* Somm. Wall near Nant Alyn, near Rhydymwyn, *W. & D.* — *L. murorum* Ach. Limestone scars in the Leet; Nannerch.

Pertusaria amara Nyl. On alders near the Alyn, south-west of Rhydymwyn, *W. & D.*; on tree-trunks near Llyn Helyg; Maes Mynan, on ash.—*P. communis* DC. Common.—*P. leioplaca* Schaer. Near Nannerch, *W. & D.*—*Urceolaria scruposa* Ach. On limestone rocks above Nant Alyn, Rhydymwyn, *W. & D.*; on a tombstone in Rhuddlan Churchyard. — *Verrucaria nigrescens* Pers. Nannerch; Halkin; Rhydymwyn; Glol. — *V. glaucina* Ach. On limestone near Clan-yr-afon, *W. & D.*—*V. calciseda* DC. On limestone rocks above Nant Alyn, Rhydymwyn, *W. & D.*

Opegrapha atra Pers. On ash-trunks, Nannerch; Cilcain; Mostyn.—*Arthonia Swartziana* Ach. On an ash-trunk in the wood south-west of Rhydymwyn, *W. & D.*

Lecidea lucida Ach. On rock near Celyn Maly, north-west of Cilcain, *W. & D.* — *L. decolorans* Flk. With the last, *W. & D.*—*L. contigua* Fr. Frequent; stony shore of Llyn Helyg; Nannerch. —*L. rivulosa* Ach. Summit of Moel Arthur; on rocks north-west of Cilcain.—*L. calcivora* Ehrh. Frequent on the limestone rocks; Nannerch; the Leet; Coed-yr-Esgob; Maes Mynan.—*L. canescens* Dicks. Cilcain; Nannerch, *W. & D.* — *L. myriocarpa* DC. Not uncommon.—*L. grossa* Pers. On tree-trunks near Cilcain, *W. & D.* —*L. cæruleonigricans* Lightf. Limestone scars in the Leet, 1904. —*L. geographica* L. forma *atrovirens* L. Judging from the distribution in Flintshire, this species would seem to be calciphobous. Moel Famma, Moel Arthur, and elsewhere along the Silurian range. At Glol (limestone), but growing on a travelled Silurian boulder, *W. & D.*

NOTES ON AFRICAN PLANTS.

By Spencer le M. Moore, B.Sc., F.L.S.

Schizoglossum Huttonæ S. Moore in Journ. Bot. 1902, p. 383. It was, I believe, Dr. Schlechter who first drew my attention to this plant, which he informed me was not a *Schizoglossum* but a *Sisyranthus*. More recently Mr. N. E. Brown confirmed this, and on re-examination of the flower I find that I made a strange mistake in the position of the pollinia, which really are erect instead of pendulous, as in the Schizoglossums. The plant should therefore be known as *Sisyranthus Huttonæ*. Mr. Brown also informs me that the Natal plant collected by Harold Fry (Herb. Galpin, 2737), which was considered identical with *Sisyranthus Randii* S. Moore (Journ. Bot. 1903, p. 201), is really referable not to that species but to *S. Huttonæ*.

Parasia (*Belmontia*) Thomasii S. Moore in Journ. Bot. 1901, p. 260. In his monograph of the genus *Sebæa* in Bull. Herb. Boiss. 1906 (a genus with which *Belmontia* is, perhaps somewhat unnecessarily, included), Dr. Schinz was unable to place the above species in his clavis. The characters relied on for this purpose (*l. c.* pp. 721–2) are firstly, the absence from, or the presence of, a number of glands ("brownsche Korper") upon the anthers; and secondly, the presence or absence of a hairy pad or ring round the style. The first of these characters was satisfied in the description cited above, where three glands, one apical and two basal, are mentioned, but nothing was said about the style. Examination shows this organ to be glabrous throughout, so that the species must be placed near the beginning of the genus, between *S. exacoides* and *S. pusilla*. It should be mentioned that the style is not half as long as the corolla-tube, as might be gathered from the description, but that it reaches, when still in position, a point about midway between the base and throat of the corolla. The real length is about 4·5–5 mm.

Lankesteria elegans T. And. The locality of the plant alluded to in my recent paper (Journ. Bot. 1907, p. 91), as also the collector, were inadvertently omitted. Dr. Bagshawe found the specimen in the Budongo Forest, Unyoro (no. 923).

Vitex isotjensis Gibbs in Journ. Linn. Soc. xxxvii. 463. On further examination I find that the plant, named as above in Journ. Bot. 1907, p. 94 (Bulawayo; *Eyles*, 1201), is different in several respects from the species described by Miss Gibbs. As it seems to be new, a description of it is here appended.

Vitex Eylesii, sp. nov. Frutex grandis ramulis robustis quadrangularibus molliter fulvo-tomentosis deinde glabrescentibus, foliis sæpius 5-foliolatis petiolis sat longis fulvo-tomentellis fultis foliolis obovatis base longiuscule cuneatis apice obtusissimis vel breviter cuspidatis et tunc apice ipso obtusis margine undulatis vel fere omnino integris membranaceis supra pubescentibus subtus griseo-tomentosis, floribus in cymis pedunculatis divaricatis densis

tomentosis dispositis, bracteis anguste linearibus quam calyx sæpe longioribus ultimis abbreviatis, calycis anguste campanulati dilute fulvo-tomentosi limbo 5-lobo lobis inter se subæqualibus deltoideis acutis quam tubus brevioribus, corollæ extus pubescentis tubo calycem breviter excedente sursum leviter dilatato lobo antico ob-ovato margine crispo apice integro quam reliqui rotundato-ovati obtusissimi multo majore, antheris subinclusis harum loculis divergentibus, ovario apice hirsutulo 2-locellato imperfecte 4-locellato, stylo incluso, ovulis juxta medium loculum affixis, drupa ——.

Foliola profecto evoluta 6·0–9·0 cm. × 3·5–5·0 cm., exstant alia juvenilia multo minora; petioluli 0; costæ secundariæ utrinque circa 10, infimæ summæque parum aspectabiles; petioli adusque 8·0 cm. long. Pedunculi communes 4·0–5·5 cm. long.; cymarum ramuli ± 2·0 cm. long.; cymæ ipsæ sæpissime 1·5–2·0 cm. diam. Bracteæ ± 0·8 cm. long., tomentellæ. Flores heliotropini. Calyx totus 0·5 cm. long.; hujus lobi ægre 0·2 cm. long. Corollæ tubus 0·7 cm. long., faucibus 0·2 cm. diam.; lobus anticus 0·3 cm., lobi laterales 0·2 cm., postici 0·15 cm. long. Stylus glaber, 0·45 cm., stigmatis rami 0·05 cm. long.

Differs from *V. isotjensis* (which is a tree) in habit, in the leaflets more markedly cuneate at the base, in the longer bracts, the relatively narrower but longer calyces with larger acute lobes, and the longer heliotrope corollas with somewhat different lobes. Among other points it is easily distinguished from *V. Hildebrandtii* Vatke by the narrow tube of its corollas.

Coleus matopensis S. Moore in Journ. Bot. 1907, p. 97. The collector of this was Mr. F. Eyles.

SEED-PRODUCTION IN VIOLETS.

By E. S. Gregory.

An erroneous impression prevails amongst botanists with regard to the seed-bearing qualities of the open early flowers of the *Nonimium* section of British violets. It has been generally admitted that an occasional cross has happened (otherwise how could hybrid violets exist?), but the serious business of producing fertile seed has been relegated to the cleistogamous or later flowers, which must, of necessity, be self-fertilized. In cases where these violet plants are deprived of the sun's rays, it has been proved that no open flowers are produced; under these conditions, however, abundant seed is furnished by the very numerous though inconspicuous later flowers.

In his *Natural History of Plants* (ii. 393–395), Kerner writes:—"The beautiful *Viola mirabilis* has scented flowers, stored with honey, which unfold great violet petals in the spring. If these blossoms are visited by hive or humble bees they are cross-fertilized; but many are not thus visited, and their fate is then to wither without effecting that process of autogamy which has been

described as taking place in the species of violet belonging to the *Melanium* section. In the summer, however, special branches of the same individual plant bring forth small green flower-buds which do not open, but nevertheless produce soon afterwards large ripe capsules full of seed. This phenomenon, in apparent contradiction to the ordinary idea of the result of the flowering process, did not escape the attention of the botanists of the eighteenth century, and they named this species of violet in which the majority of the large open blossoms fail to produce fruit whilst the closed bud-like flowers are invariably productive *Viola mirabilis*, or 'the Wonderful Violet.' In *V. mirabilis* and in all its allied species, called 'caulescent' in the language of descriptive botany, the cleistogamous flowers are developed on special shoots, and these shoots are either erect or else prostrate in long zigzags. . . . . In several violets of the kind called by descriptive botanists 'acaulescent,' such as *V. collina* and *V. sepincola*, the cleistogamous flowers develop likewise underground, their stalks springing from special shoots of the rootstock. In all these cases the two kinds of flowers are always borne on the same plant, though on different branch systems. . . . There is a species of violet named *V. sepincola* which grows deep in the shade of the woods clothing the hills at the foot of the Solstein chain in the Innthal district. I saw it there for the first time about the middle of May, and it was then covered with an abundance of ripe fruit. In following years I looked for flowers of this plant early in the spring, as soon as the snow had melted, but found that not a single individual had developed open flowers with expanded petals on erect above-ground stalks. On the other hand, there were a number of cleistogamous flowers concealed under the fallen leaves and partially buried in the earth, so that it looked very much as if the species produced no other kind of blossom. But plants subsequently reared in a part of my garden which was exposed to the sun's rays during some hours of each day developed, in the next year but one after their being sown, in addition to cleistogamous flowers, beautiful scented blossoms of a violet colour, which were borne on erect stalks, and in due time unfolded their petals. This result throws some light on the nature of the stimulus which causes the formation of the flowers in question. No open aërial flowers were produced by *V. sepincola* so long as it grew in the cool shade of a dense wood, but when transferred to open ground accessible to sunlight, such flowers were developed. One can hardly err in ascribing to the sun's rays a very important influence in stimulating plants to the inception of flowering-shoots, especially such as bear blossoms possessing bright-coloured petals. Indirectly, however, this advantage accrues to the plants in question that, living as they do in deep shade, where no bees would, in any case, visit them, even if they had open flowers, they can confine their constructive energy to the inception and development of cleistogamous flowers and save themselves the trouble of producing open flowers adapted to cross-fertilization (but useless in the place in question). If the spot where the violet grows becomes exposed to the sunlight through

the trees shading it being blown down or felled, humble and hive bees make their appearance in search of honey, and, buzzing from flower to flower, cross one with another. In such circumstances the open sweet-scented violet-blossoms are in request, and the same plant-individual, which for years in the dark shade has developed none but cleistogamous flowers, is now stimulated by the sun's rays into producing flowers with expanded petals."

Lord Avebury (*British Wild Flowers in Relation to Insects*, p. 58), after having explained the uses of cleistogamous flowers to the order *Violaceæ*, says :—"In fact, according to Bentham, the pansy (*V. tricolor*) is the only one of our English species in which the showy flowers generally produce seed." With regard to this plant Mr. Darwin writes :—"It is curious in this case, as in many others, how long the flowers may be watched without seeing one visited by an insect. During one summer I repeatedly watched some large clumps of heartsease many times daily for a fortnight before I saw a humble bee at work. During another summer I did the same, and then one day, as well as on two succeeding days, I saw a dark-coloured humble bee visiting almost every flower in several clumps, and after a few days almost all the flowers withered and produced fine capsules."

In the spring and summer of 1905 I originated a series of experiments, hoping thereby to ascertain whether the early open flowers of our British violets are useful as well as ornamental. A wild-flower garden at Fairleigh, Weston-super-Mare, where I cultivated almost all our violets (excepting those which need marsh or fen) greatly facilitated my efforts. A sunny bank, facing south, helped the bees to do their duty, although I must admit that they were more often occupied in visiting plants of the *Boraginaceæ*.

As the showy open flowers unfolded, I tied red silk round the stems of *V. odorata* vars. *sub-carnea* and *alba*, a red violet (which I suspect of being a cross between *V. sub-carnea* and ordinary *V. hirta*), *V. hirta*, *V. hirta* var. *propera* (of which the seedlings were noticeably hairy), *V. Riviniana*, and *V. silvestris*. The two latter were less disposed to set seed than were the acaulescent violets, though the seed set by them germinated more quickly. On May 4th I tied muslin bags around the now perfectly formed capsules, and later carefully gathered in my seed, which was placed at once in paper-bags and labelled.

In July of the same year, by the kindness of Mr. Lynch (the curator), I was allowed to sow the seeds in boxes protected by a frame in the Botanic Gardens, Cambridge. Except in the cases of two species, I counted in the seeds, by which means it was possible to arrive at pretty accurate results, which were as follows :—

	Seeds Sown.	Seedlings.
1. *V. odorata, sub-carnea*...	12	12
2. *V. odorata, alba*	12	8
3. *V. odorata* (red)	30	3
4. *V. hirta*	1	1
5. *V. hirta, propera*	Many	Many
6. *V. Riviniana*	Several	12

3. This is the violet which I suspect of being a cross between *V. odorata alba* and *V. hirta*.

4. The capsules in this species had been the prey of wood-lice.

5. Seedlings noticeably hairy.

6. In this box three seedlings appeared in the autumn, whilst the rest waited for spring.

As the plants are now flourishing in the *Viola* bed of the Botanic Gardens, I consider the experiment conclusive.

EUPHORBIA PEPLIS L. IN BRITAIN.

By C. E. Salmon, F.L.S.

In September of last year Mr. C. J. Alexander, of Tunbridge Wells, was fortunate enough to alight accidentally upon a plant of *E. Peplis* on the coast of Sussex. It was growing in a very suitable and likely spot in the eastern part of the county; and the finder, not realizing at the time the importance of his discovery, did not search for further specimens. A week or two afterwards I visited the locality, but failed to see any more examples during a somewhat prolonged search. Mr. F. J. Hanbury also tells me of the occurrence of the plant in Kent in 1900.

As this discovery of *E. Peplis* in Sussex and Kent appears to considerably extend its range eastward in England, the Isle of Wight being formerly its most easterly station, it may not be out of place here to give a detailed and, I think, a fairly complete list of its already known British or Channel Island localities, and the results are appended below.

It seems likely that the seeds of *E. Peplis* may remain buried in the shore sands at some considerable depth for a long period, and it is only when local conditions alter under tidal or other influences that the seeds may find themselves at a suitable depth underground for germination. On the other hand, it must not be forgotten that the mischievous and inane practice of intentionally sowing seeds of rare plants in wild localities is not yet wholly stamped out in England.

1. *Cornwall West.* "Tithymali marini species minima ex Cornubia" (*Merrett*, 118 (1666)). "Inter Pensans et Marketjeu copiose in Cornubia" (*Ray*, Cat. 237 (1670)). Sands by Penzance Green, very sparingly in 1830 and 1831, *H. C. Watson* (New Bot. Guide, ii. 1835). Penzance, *Lloyd*, 1836 (Hb. Boswell). Marazion Green, *E. T. Bennett* (Phytol. iv. 1 (1851)). St. Agnes, Scilly Isles, *J. Woods* in Penzance Nat. Hist. and Antiq. Soc. Trans. 1852, but Dr. Ralfs was never able to verify it (Davey, Tentative List, 193, 1902). St. Mary's, Scilly Isles, 1900, *R. N. Milne* (*Davey* in Journ. Roy. Instit. Cornwall, xvi. 72); still there, but in very small quantity, in 1905, *C. E. S.*

2. *Cornwall East.* In Top. Bot. without personal authority. Whitsand Bay, near the Rame, one plant in 1847 nearly at the

eastern end, surrounded by *Cakile maritima*, *F. P. Pascoe* (Phytol. ii. 944 (1847)). Lantick Bay, in abundance on some parts of the beach, *C. Peach* (T. Q. Couch's Addenda to Fl. of Polperro in Roy. Corn. Polytech. Soc. Rep. 1849).

3. *Devon South.* "Prope Exmouth in Devonia copiose" (*Hudson*, Fl. Angl. ed. 2, 208, 1778). At Exmouth and on the Warren (*J. P. Jones*, Bot. Tour in Devon and Corn. 1821). Between Paignton and Torquay (*C. S. Cullen*, 1808, Hb. Brit. Mus). Torbay! *Rev. J. Jarvis* (Hb. Brit. Mus.). Blackpool Sands, near Stoke Fleming (Herb. Borrer at Kew). Seaton, *Hore* (Keys, Fl. Devon & Corn. 1871). Goodrington Sands (*Stewart*, Torquay Fl. 1860). Torcross, 1875, *W. B. Waterfall* (Herb. A. Bennett). Slapton Sands, 1878, *W. Curnow* (Hb. A. Bennett); occurring there also in 1898, 1900, 1901!

4. *Devon North.* In Top. Bot. without personal authority. Northam Burroughs, *Mr. Yonge* (Bot. Guide, i. 201, 1805).

6. *Somerset North.* Sandy coast from Burnham to Brean, *J. C. Collins MSS.* (New Bot. Guide Supp. 561); also, for county only, "Gapper cat." in New Bot. Guide, 36, 1835. "Not found for many years," *R. P. Murray*, Fl. Somerset, 1896.

9. *Dorset.* Among sand at Bridport, *J. Sims* (Bot. Guide, i. 223, 1805). West Beach, Bridport Harbour, near the shipyard, *Miss Clark*, 1875 (Mansell-Pleydell, Fl. Dorset, ed. 2, 241, 1895).

10. *Isle of Wight.* Sandown Bay, *J. S. Mill* (Phytol. i. 91 (1842)). Now extinct there (*Townsend*, Fl. Hants, ed. 2, 365, 1904). St. Helen's Spit! 1872, *B. Daydon Jackson* (Herb. Brit. Mus.).

14. *Sussex East.* 1906! *C. J. Alexander* (see p. 158).

15. *Kent East.* One specimen between Deal and Sandwich, 1900, *Rev. J. Roffey* (specimen sent to F. J. Hanbury).

41. *Glamorgan.* In Top. Bot. without personal authority. Found abundantly on sand-hills at Porthcawl in 1834, but sought in vain in 1841 (*Jas. Motley* in Phytol. ii. 974). Swansea, 1834 (Hb. Cardiff Museum). Specimen seen by A. Bennett.

46. *Cardigan.* In Top. Bot. without personal authority. Neighbourhood of Aberystwith, *Evans.* "I have received a specimen from the shore at Aberystwith," *T. F. Forster, Jun.* (Bot. Guide, 73, 1805).

Ireland—Waterford. Garraris Cove, near Tramore, 1859 (Hb. Mackay). "No doubt extinct" (Cyb. Hibern. ed. 2, 520).

Jersey. St. Ouen's Bay (*Babington*, Primit. Fl. Sarn. 87, 1839). Grouville Bay, *J. Piquet* (Lester-Garland, Fl. Jers. 105, 1902). St. Aubin's Bay, *J. Piquet*, spec., 1860 (Lester-Garland, *l. c.*).

Guernsey. Gosselin, 1788. In great plenty on the sands of Grand Havre at some distance beyond Vale Church (*Babington*, Memorials, 68, August, 1837). Guernsey! *A. G. More*, 1859 (Herb. Brit. Mus.). Extinct in Guernsey for the last half-century (*Marquand*, Fl. Guern. 164, 1901).

Alderney. Platte Saline and Crabbie Bay (*Marquand*, l. c. p. 378). Alderney! *W. S. Rogers*, 1842 (Herb. Brit. Mus.).

Sark. (*Babington*, Primit. Fl. Sarn. 87 (1839)).

Herm. Herm! *C. C. Babington*, 1837 (Herb. Brit. Mus.). North end of Herm (*Babington*, l. c.). On the shell beach in 1897, *Mrs. Randell* (Marquand, *l. c.* p. 456). Ditto, 1898, abundant, *Marquand*. Herm! *C. P. Hurst*, 1902 (Hb. C. E. S.).

WATSON EXCHANGE CLUB REPORT, 1905–6.

[The following notes are extracted from the Report of the Watson Botanical Exchange Club for 1905–6. The Report contains a "half-plate photo" of *Polygala serpyllacea* var. *vincoides*, a plant described in this Journal for 1906, p. 34. The notes as usual display those differences of opinion between competent botanists which are apt to puzzle the confiding beginner; and the matter is further complicated by the fact that in some cases the same plants receive further (and differing) comments in the Report of the Botanical Exchange Club for the same year: see, for example, the notes in each Report on specimens of *Lepidium heterophyllum* from Northamptonshire: "*Viola Riviniana* Reichb., *forma minor*," which Mr. Druce (Rep. Bot. Exch. Club) agrees with Mrs. Gregory in thinking "should certainly equal *V. flavicornis* Forster," Mr. Marshall thinks (Rept. Watson Club) "merely a starved state, and not deserving a special name." Those who are doubtful as to the specific distinctness of certain "critical" plants will find their scepticism confirmed by the notes on *Euphrasia*.

It may be worth while to call attention to a not infrequent misuse of the term "type," of which an example is found in the statement that Gloucestershire specimens of *Carex Leersii* are "exactly like the type-specimen in Herb. Brit. Mus." A "type-specimen," as defined by Mr. Jackson in his *Glossary*, is "the original specimen from which a description was drawn up," and this is undoubtedly the meaning of the phrase in its strict sense. In the present instance the specimens of *C. Leersii* in the National Herbarium may be described as authentic, as they were collected and determined by F. Schultz and distributed in "F. Schultz and F. Winter, Herbarium Normale," Cent. 2, n. 173; but they are not "type."

May we suggest that it would be useful if the Reports of both Exchange Clubs included a list of the addresses of their members? This was done in the early days of the Botanical Exchange Club, which now does not even give the names of those belonging to it.—Ed. Journ. Bot.]

Clematis Vitalba L. Martinshaw Wood, Leicestershire, v.-c. 55, Sept. 1905. I am sending a few specimens of *Clematis*, as it has hitherto been recorded as naturalized, or an escape, for Leicestershire. In the Martinshaw it is found in great plenty on the rocks

and disused quarries, and appears to be indigenous.—C. B. Headly. This is certainly the best record we have; but the *Clematis* is almost exclusively a chalk plant, and I fear we cannot claim it as indigenous for Leicestershire, unless it should be found on the oolite on the eastern border of the county.—W. B [ELL].

Ranunculus tripartitus DC. Catsfield, East Sussex, v.-c. 14, 1894.—Coll. E. S. Salmon. Comm. C. E. Salmon. A very pretty but puzzling Batrachian. Named "*peltatus* var. *truncatus*," "*intermedius*," and "*ololeucos*" during the past three or four years by well-known botanists. Major A. H. Wolley-Dod says that "the almost free stipules remove it from any *peltatus* form, and its small flowers are against this, too." *R. ololeucos* Lloyd must be very similar to this plant, but the fruits of that species have longer beaks, and the petals are wholly white. Prof. Corbière very kindly sent me a specimen. These Catsfield examples show well-developed capillary submerged leaves, and appear to be large-flowered *R. tripartitus* DC. The flowers were usually of *Lenormandi* size.—C. E. S.

Viburnum Opulus L. (yellow-fruited form). Narborough, Leicestershire, v.-c. 55, July, 1904. This form, which was first pointed out to me by Mr. A. B. Jackson, is remarkable in that the berries never become red, but retain their yellow colour until they fall. The bushes from which these specimens were gathered presented a striking contrast to those close by that bore berries of the normal red colour, these latter being red practically as soon as the fruit is formed. Beyond this characteristic there is no essential difference between the fruit of the type-plant and that of the form, except, perhaps, in that the berries of the latter may be said to be less globose.—A. R. Horwood. The yellow-fruited Guelder-rose has been known at Narborough Bogs for many years; and it is quite constant in the colour of its fruit. I know no other station. Is it worthy of a varietal name or of being raised to a specific form? Some plants with less differentiation and constancy have been so honoured.—W. B. A yellow-fruited form would seem to be of rare occurrence. I have not found any reference to it in books, and have it only from Ednaston, South Derbyshire.—E. F. L.

Linaria supina Desf. Par, East Cornwall, v.-c. 2, Sept. 13th, 1905. This plant occurs in great abundance along the sandy beach all around the harbour, along the St. Blazey-Fowey railway line, and by the roadsides, and I think it has every claim to be considered a native. It has been known as one of the common plants of that district for quite sixty years.—F. H. Davey.

Mimulus luteus L. [*Langsdorfii* Donn.] Walkham Vale, South Devon, v.-c. 3, May 29th, 1905. This species is very plentiful on the banks of the River Walkham. There are large masses of its yellow blooms for a distance of seven or eight miles. In Mr. Archer Briggs's *Flora of Plymouth* this station is not mentioned. These specimens differ from those from the Dove in Derbyshire, in that these are mostly upright and rooting from the two or three lower nodes only, while the Derbyshire ones are more recumbent and

root at least three-fourths of the length of the stem.—C. B. Headly.

Nepeta Glechoma Benth. var. parviflora Benth. (1) Lowesby, Leicestershire, v.-c. 55, May 21st, 1905.—A. R. Horwood. (2) Scraptoft, Leicestershire, May 18th, 1905.—A. R. Horwood. (3) Sheet Hedges Wood, Leicestershire, May, 1905.—H. P. Reader. (1) According to Bab. Man. ed. ix., this should be subglabrous; the present plant is very hairy. Mr. Beeby once remarked to me that the species was trimorphic, and that he did not believe in the alleged variety.—E. S. M. The small-flowered form is nearly as common in Leicestershire as the type, and is usually found in close proximity thereto.—W. B.

Salicornia appressa Dum. Thorney Island, West Sussex, v.-c. 13, Aug. 25th, 1905. I came upon a patch of nearly half an acre in what I believe to be a hitherto unknown locality. One characteristic is entirely lost in pressing. The stems and roots go down perpendicularly into the ground, whilst the foliage lies closely pressed upon the surface, absolutely at right angles to the stem.—R. S. Standen. Likely enough to be right; but much too young for certain determination.—E. S. M.

Urtica pilulifera L. var. Dodartii (L.). Cultivated, Underdown, Ledbury, July 4th, 1905. These are self-sown seedlings—the type (*pilulifera*) has vanished from my grounds, and this is the only form now found there. I forward a specimen of *pilulifera* (type) gathered in 1901. I believe that the late H. C. Watson noticed the same thing when he grew the plant.—S. H. Bickham.

Glyceria plicata Fr. var. pedicellata (Townsend). Scraptoft, Leicestershire, v.-c. 55, June 28th, 1905. Prof. Hackel, in confirming this determination, writes, November, 1905, "In my view, *G. pedicellata* Towns. is a form of *G. fluitans*, not of *plicata*. Your specimen agrees well with the authentic one in my own herbarium from Townsend."—A. R. Horwood. Mr. Townsend agreed that his *G. pedicellata* was *G. fluitans* × *plicata*; it never fruits.—E. S. M.

SHORT NOTES.

Lithospermum officinale L. var. pseudo-latifolium in Cornwall.—In August, 1905, while staying at St. Ives, we found, both at Carbis Bay and at Lelant, a plant which we labelled provisionally *Lithospermum officinale*, on account of the character of its seeds. In its habit and colour and shape of leaves, however, it differs widely from the type. Comparison with Mr. C. E. Salmon's description of *L. officinale* L. var. *pseudo-latifolium* (Journ. Bot. 1906, 367) has shown a very close agreement. Our plant is much less strict than the type, the leaves are ovate-lanceolate acute, much more broadly based than in the type, dark green and not grey-green in colour, and with the under surface less hairy. The seeds are more markedly cavo-punctate than seems to have been the case in

Mr. Salmon's plant, but otherwise the agreement is very close indeed. The distinction from the normal *L. officinale* is well-marked, the whole appearance and habit being entirely different.—E. & H. Drabble.

Alnus rotundifolia Mill. (p. 125).—The name published as above by Miller is to be found in the *Abridgement of the Gardeners' Dictionary*, published in 1771, where binomials are consistently used. It must replace Gaertner's name of 1791.—G. Claridge Druce.

A Glamorganshire Sedge.—In Journ. Bot. 1902, 250, Mr. W. A. Shoolbred and I recorded *Carex Leersii* F. Schultz (my no. 2550) from hedge-banks near Pyle. It is a smaller plant, and in some other points differs from an authentic specimen at Brit. Mus. (F. Schultz & Winter, Herb. Norm., Cent. 2, 173). Herr Kükenthal, on whose authority we published it, has now named specimens in Herb. C. E. Salmon as "*C. echinata* Murr. = *C. Pairæi* F. Schultz." In Lond. Cat. ed. ix. *C. echinata* replaces *C. stellulata* Good. *C. Pairæi* has been found recently in West Cornwall by Mr. Druce.—Edward S. Marshall.

[In his *Prodromus* (1770) Murray gives no description of his *C. echinata*, which stands (p. 76) as: "*Carex echinata* mihi f. Car. spicis ternis echinatis, glumis lanceolatis, capsulæ mucrone simplici Hall. Hist. n. 1366. Oed. Dan. T. 284." Both Haller's description (which Murray quotes as above) and Oeder's figure undoubtedly represent the plant subsequently known as *C. stellulata* Good. We have however in the National Herbarium the plant from Murray's herbarium, labelled by him: "Carex echinata *mihi* v. *Prodromus* p. 76. Hall. Hist. n. 1366. Hercyniā citat: ego in pratis udis Gotreyde [?] crebro referi. 1770." This has been named by Mr. C. B. Clarke *C. muricata* and by Pastor Kükenthal *C. Pairæi* F. Schultz: Townsend (Fl. Hants, ed. 2, 463) under *stellulata* notes "Murray's *C. echinata* is *C. divulsa*; see sp. in Brit. Mus. Herb." While it thus appears that the plant which Murray intended to describe was what is now called *C. Pairæi*, the description cited from Haller, which is the only description he gives, and the figure he quotes from Oeder are, as has been said, *C. stellulata*, so that the name, if synonymy be excluded, is a *nomen nudum* and cannot stand. In face of the synonymy, however, and of the practice when Linnæus's books and herbarium do not agree, it would seem that *C. echinata* Murr. (Prodr. 76, non herb.) should stand as the name of the plant.—Ed. Journ. Bot.]

Fumaria Boræi Jord. (p. 9).—The Rev. W. Moyle Rogers states that he found no Fumarias in the English Lake District in the summer of 1906. In August of that year we found *Fumaria Boræi* by the side of the road leading from Dunmail Raise to Grasmere. The plant did not occur abundantly, only two or three specimens being seen.—E. & H. Drabble.

Sisymbrium pannonicum Jacq. in Cheshire.—This plant, which occurs abundantly at Crosby, on the Lancashire side of the Mersey, does not seem to have been recorded from the Cheshire side. It

was found in considerable quantity at Hoylake in September, 1905, growing on waste ground, and evidently quite established.—E. Drabble.

A Hybrid Erigeron.—In August, 1884, I found *E. acris* L. and *E. canadensis* L. growing together in sandy ground near Tilford, Surrey. With them was one specimen which at the time I suspected to be their offspring, and, having recently come across the plant in my herbarium and carefully examined it, I am convinced that such is really the case. Though *E. acris* × *canadensis* does not seem to have been previously detected in Britain, Focke says that it has been found in a few stations in East Germany.—Edward S. Marshall.

Stipa membranacea L.—In the *Annals of Scottish Natural History*, 1906, p. 229, I suggested that *Festuca uniglumis* Soland. was antedated by the trivial name given by Linnæus as *Stipa membranacea*, Sp. Pl. 560, 1753. This was contested in this Journal (p. 28), and more recently on p. 107, where Messrs. Britten and Rendle say: "*Stipa membranacea* L., which has been suggested as a synonym, is altogether doubtful; for full discussion, see Duval-Jouve in Rev. Sci. Nat. Sér. 2, ii. 32–5, 1880." My attention to this grass was called many years ago when I examined the grasses of the Linnean Herbarium and checked them with General Munro's excellent paper which appeared in Journ. Linn. Soc. vi. pp. 33–55, and in which he identified the above plant with *Festuca uniglumis*. Recently I have again examined the specimen. Oftentimes the herbarium of Linnæus is of little value in determining the types of the *Species Plantarum*, but in this instance no such difficulty occurs. The specimen is labelled in Linnæus's own hand, "Stipa membranacea," and its origin is given "Loefling. ex Hispania"; and as the description in Sp. Pl. is based on Loefling's plant from Spain, we need have no hesitation in saying that this specimen is the type. It is true the description "laxa debilis" does not appear applicable to *uniglumis*; but the fact is the plant of Loefling is a lax shade-growth form, to which the above description is not inapplicable, while it also helps to corroborate the identity of the specimen as being the Linnean type. Linnæus says that the habit is that of an *Avena*, and this at first glance suggests something quite away from *Festuca*; but the Linnean genus *Avena* contained *A. flavescens*, to which indeed this specimen is not very dissimilar. It is true that Duval-Jouve (*l. c.*) writes at considerable length on the subject, but his objections are chiefly based on the fact that Linnæus's description on the genus *Stipa* excludes this plant. Obviously, if it were a *Stipa*, there would be no reason in removing it to *Festuca*. He also says that the words "laxa debilis" cannot refer to *uniglumis*. But a glance at the Herbarium would have shown that they do. On the other hand, Link, Parlatore, and other eminent botanists accepted *Stipa membranacea* as synonymous with *F. uniglumis*; therefore Link, who put it in the genus *Vulpia*, called it *V. membranacea*. I may say that Prof. Hackel, although bearing in mind the words "laxa debilis" and

not having had an opportunity of consulting the Linn. Herb., considered *Stipa membranacea* was the earliest binomial. As I have said, Gen. Munro so identified it, and Sir James E. Smith has written on the specimen, "F. uniglumis proxima." I have no doubt Munro's identification is correct, although it is very different in habit from the grass when growing in mobile sea-sand, and a side-light is thrown on this point by a cultivated specimen in Herb. Brit. Mus. closely resembling the Linnean type from Hugh Davies, of Anglesey, who draws attention to its very different appearance from the normal sea-coast form. I therefore venture to contend that, if the earliest trivial is to be maintained, our plant must be known as *Festuca membranacea*.—G. Claridge Druce.

A Correction.—Owing to a misunderstanding, the measurements of the figures on Plate 484A have been given on p. 85 incorrectly; they should be twice as great as there given—*viz.* figs. 1, 2, × 50; figs. 3, 4, 5, × 250.

The conclusion as to the true position of *Splachnobryum* being among the *Splachnaceæ* has been recently confirmed on independent grounds by W. J. Jongmans (*Uber Brutkörper bildende Laubmoose*; Nijmegen, 1907).—H. N. Dixon.

NOTICE OF BOOK.

Recent Progress in the Study of Variation, Heredity, and Evolution. By Robert H. Lock, M.A. Pp. 299, with forty-seven figures and diagrams, and five portraits. London: John Murray. Price 7s. 6d. net.

The University of Cambridge seems to be the headquarters of a school of philosophical biologists, who, profoundly interested in those problems of biology which at first were "made in Germany," and fascinated the minds of the keenest scientists among those engaged in original research in the Fatherland, while they adopted German methods both of analysis and synthesis of facts and theories, have succeeded in forming an English group of workers in the problems of life and mind, the progress and results of whose labours are in no wise less important and often more lucid in their literary expression than those of their German co-workers in similar fields of investigation and scientific research. The problems which modern biology is attacking with perennial vigour bear chiefly on Variation and Heredity, and the side issues either involved in them or associated with them. Natural Selection, which formerly occupied such a prominent place in the Darwinian scheme of the survival and salvation of the fittest (a prominence, however, which was neither sanctioned nor encouraged by Darwin himself either in his correspondence or in his later works), is now, by general consent, relegated to the more subordinate position of an agency which is no longer considered causal but directive.

Mr. Lock tells the story of the progress towards solution of the

inter-related problems of Variation and Heredity in their bearing on Evolution with a clearness and felicity of expression especially welcome in an English treatise on these somewhat abstruse subjects. The portraits of Darwin, Francis Galton, Prof. de Vries, and Mendel are admirable; and that of Kölreuter (who died in 1806), after an engraving, serves to call to mind the original work of an early student of the phenomena of hybridity who seems to have escaped the notice of modern botanists, even if he has not been all but forgotten by them.

No one now attempts to defend the Linnean concept of the species, as an entity immutable and constant, incapable of either degeneration or of modification. Few, however, are prepared to go as far in their extreme views as to abolish species altogether; as in the case of the reader of a paper on Corals at a meeting of the Linnean Society not so very long ago. Therein it was suggested, so great was the confusion encountered in attempting to adjust specimens to catalogues and descriptions, to abolish the grade of species altogether, and to label new finds as "chunk no. 1 from the Australian Reef," or "chunk no. 2 from the Indian Ocean."

So arbitrary and indefinite is the idea of a species, that, as the author implies in his first chapter (on p. 9), "Jordan's species are just such true and constant groups as those of Linnæus." Again, "Varietates levissimas non curat botanicus," said Linnæus. But a good many botanists, and among them the most painstaking and critical of observers in the field, have rightly devoted much attention to structural differences which preserve their distinctive characters and come true to seed, when transplanted to the uniform soil of a garden—as Jordan himself found, when he applied the method of experiment.

It is of interest that the author endorses an opinion doubtfully expressed, by many apologists, that Darwin, at a critical period in formulating his hypothesis, was profoundly impressed by Malthus's Essay on Population, and, seeking in Nature a substitute for the artificial selection of the breeder, found it in the extension of the Malthusian doctrine to organic beings in general.

It is not without significance that Mr. Lock devotes two whole chapters out of the ten to the discussion of Mendelism. The original work and valuable experiments of the brilliant and far-seeing Abbot of Brünn, unnoticed and lost sight of for a generation, and accidentally brought to light by the independent investigations along similar lines of research by De Vries in Holland, by Correns in Germany, and by Tschermak in Austria, serve only to enhance the reputation of their author, and to emphasize the value and the importance of the proposition now known as Mendel's Law. Cuénen's experiments on mice, Mr. R. H. Biffen's experiments with cereals—especially wheat, and Messrs. Bateson and Punnett's somewhat complex and involved study of Andalusian fowls have considerably widened the basis for the application of the Mendelian Law and its ancillary corollaries. The author is certainly justified in stating that "there can be no sort of doubt that Mendel's brief paper is the most important contribution of its size which has ever been made

to biological science." The *dominant* and *recessive* factors in the phenomena of Heredity have to be reckoned with in the improvement or degeneration of the race. The one set of factors, like the other, are under the directive influence of natural selection; and that higher agency which is causal rather than directive must be left to control and fix those factors which make for the good of the race, and to eliminate those factors which retard its progress.

Finally—and this seems to be the gist of Mr. Lock's arguments—the author's work is intended to show that Mendel's Law of Heredity is considerably simpler than, and completely replaces (in the opinion of the most competent biologists), Weismann's Theory of Inheritance, the fashionable biological creed of some years ago: though it must not be forgotten that many of the conceptions used in the Mendelian expression of the facts are unconsciously borrowed from Weismann's theory. As Dr. J. T. Cunningham points out, in discussing Eimer's *Organic Evolution*, selection, whether natural or artificial, is analogous to the process of denudation in geology. It explains extinction of forms, gaps, and intervals which separate groups of genera, just as denudation explains the want of continuity in the stratified rocks.

FREDERIC N. WILLIAMS.

BOOK-NOTES, NEWS, &c.

AT the meeting of the Linnean Society on 7th March, 1907, Messrs. H. & J. Groves exhibited a series of specimens of *Nitella ornithopoda* A. Braun, collected by the Rev. Canon Bullock Webster. This rare species has only been found in a small district in the West of France, from Angoulême in the north to the south of Arcachon, and doubtfully in one locality in Portugal. The especial interest of the specimens exhibited, which were collected to the south of Arcachon in March and April, 1906, was that they represented gatherings of the plant from very different habitats and showed great variations. The plants collected in shallow ditches were already in full fruit, while those from running water and from Lake Cazan were quite immature, and so far sterile. Only a few specimens of this species have previously reached England, and the collection exhibited was probably by far the most extensive series of forms yet obtained. Braun recognized two forms—the more typical one almost resembling in habit some forms of our *N. tenuissima* (this form was called f. *moniliformis* by Prof. Migula), and the other var. *laxa*, which resembles *N. gracilis*. Among the specimens were some from roadside ditches near Arcachon, representing a third and very distinct form; this may be called var. *robusta*. It is 4–5 in. high, very dark green, much more robust than the ordinary form, and with comparatively short ultimate rays to the branchlets, giving it the appearance of *N. mucronata* in miniature. *N. ornithopoda* is interesting as representing in Europe Braun's section *Polyarthrodactylæ*. The headquarters of the species in this

section is Australasia, where there are eleven species, two reach north to Japan, and one occurs in India. Two or three are found in South America, and one in North America. Three species occur in Africa, one of which is also recorded by Dr. Nordstedt from Portugal. It is not quite certain that *N. ornithopoda* is distinct from this last. At the same meeting Mr. G. C. Druce read a paper on the occurrence of *Spergularia atheniensis* and *Agrostis verticillata* in the Channel Islands, specimens of the plants being shown.

The Oxford University Press has just published *The Dillenian Herbaria*: an account of the Dillenian collections in the Herbarium of the University, together with a biographical sketch of Dillenius, selections from his correspondence, notes, &c., by Mr. G. C. Druce, edited, with an introduction, by Prof. Vines. We hope to notice it in an early issue.

Acting on the principle that "forewarned is forearmed," Mr. E. S. Salmon, the mycologist of the South-Eastern Agricultural College, Wye, has been doing his best to inform gardeners and fruit-growers of a danger that threatens them in the advent of a new gooseberry disease. It is a white mildew, belonging to the same family of fungi as the hop-mildew, and it fastens on leaves and fruit, weakening the bushes, and preventing the growth of the berries, or rendering them unfit for consumption. The disease is indigenous to America, and has doubtless been transported to Europe along with some young bushes. The fungus made its appearance in Ireland, where it was identified in 1900, and where it has now spread over a considerable area. Recently it has turned up in England, in Worcestershire, imported, it is strongly suspected, on gooseberry bushes and on *Ribes aureum* from the Continent; for the Continent of Europe has also been invaded since about the year 1900. The mycologists there, however, are on the alert, and, with Government aid, are trying to stamp out the pest. Mr. Salmon's efforts have unfortunately been hampered by the action of Mr. Massee, the expert for the Board of Agriculture, who alleged that the disease was not new, that it was comparatively harmless, and that it could easily be kept in control by the use of fungicides. Mr. Salmon's contention is that for this disease fungicides are of comparatively little use, and that Government aid is necessary to stop all importation of bushes for a time. It is fatally easy for Governments and for people to do nothing, and a willing ear is lent to the man who advises that policy; so no attempt has yet been made to check importation. The Board of Agriculture has, however, recognized that there is need for watchfulness, and has issued a leaflet warning growers of the serious nature of the disease. More active measures will be taken, we do not doubt, when once the fungus has become thoroughly established, and we shall have the satisfaction of shutting the stable-door after the steed has been stolen.

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No. 533 MAY, 1907 Vol. XLV

THE

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BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

PAGE

Three Interesting Ascomycetes. By W. B. Grove, M.A. (Plate 485) 169

Forms of *Potamogeton* new to Britain. By Arthur Bennett 172

Synopsis of the Orders, Genera, and Species of Mycetozoa. By A. & G. Lister 176

Note on *Coffea Engleri*, &c. By K. Krause 197

British Roses of the *Mollis-Tomentosa* Group. By Rev. Augustin Ley, M.A. 200

Short Notes.—*Glyceria Foucaudii* Hackel in Hampshire.—British Rubi.—Spanish and Portuguese Carices.—Œcology of *Montia fontana* L. — *Hypericum humifusum* L. var. *Liottardi* Vill.—*Schistostega osmundacea*. — *Sisymbrium pannonicum* in Cheshire.—*Potamogeton salignus* A. Fryer 210

Notice of Book:—

Sukkulente Euphorbien. Von Alwin Berger 212

Book-Notes, News, &c. 213

Supplement.—A Flora of Glamorganshire. By H. J. Riddelsdell, M.A. (continued).

LONDON

WEST, NEWMAN & CO., 54, HATTON GARDEN, E.C.

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THE JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

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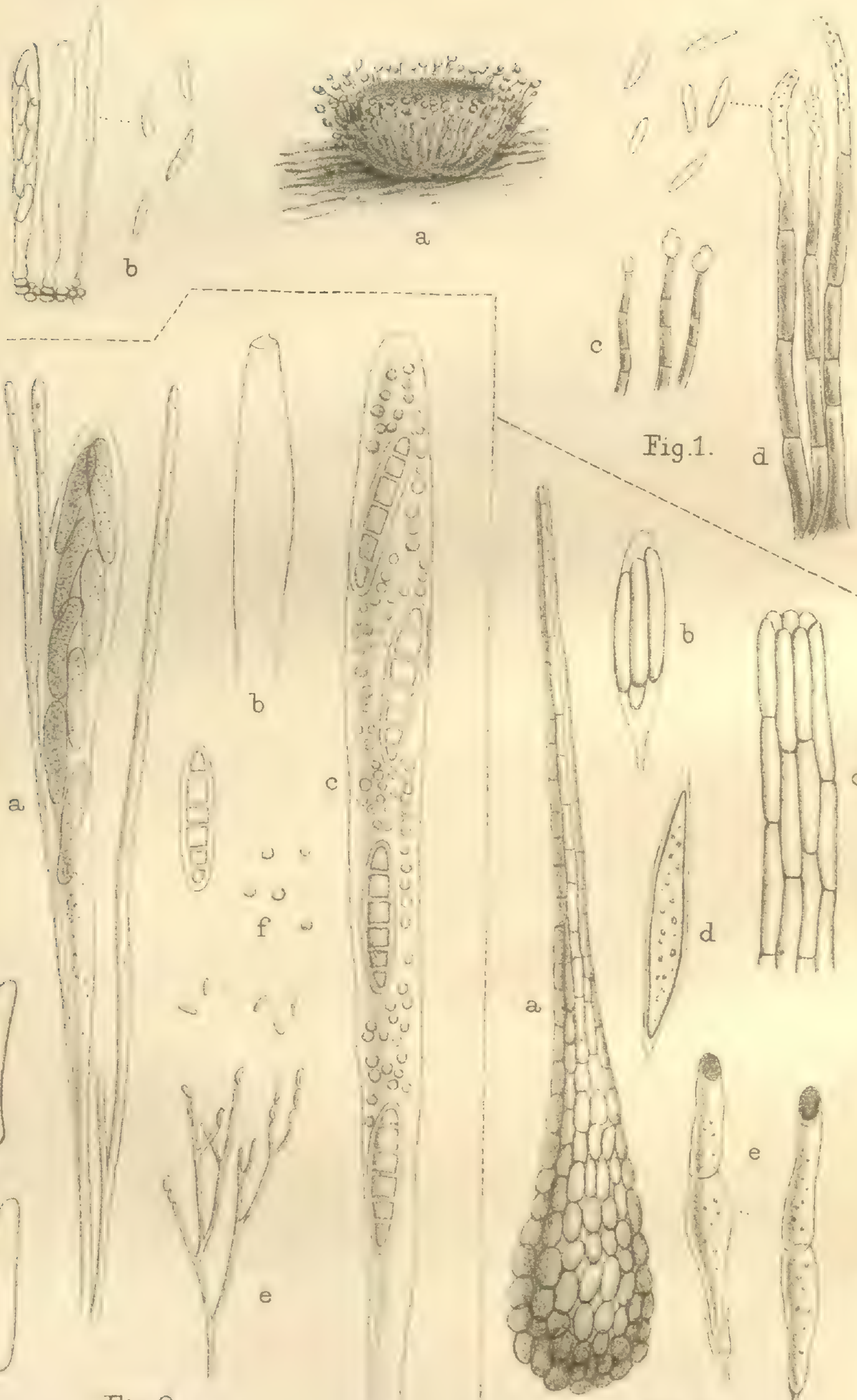

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Three Interesting Ascomycetes.

THREE INTERESTING ASCOMYCETES.

By W. B. Grove, M.A.

(Plate 485.)

1. Dasyscypha canescens Mass. F. F. iv. 346. (Fig. 1.)
Lachnella canescens Phill. Disc. 259.
Peziza canescens Cooke ex Phill. *l. c.*

Some specimens of this Discomycete, which I found in March on dead wood at Studley, presented a very peculiar appearance under a lens, on account of their hoary aspect. With a low power of the microscope this was seen to be due to numerous brown hairs, many of which bore at their tips an amorphous shining-white mass, which recalled the crystals of oxalate of lime borne on the hairs of *D. ciliaris*, with the exception that the lumps were very irregular in shape and size.

Under a higher power these masses were found to consist, not of crystals, but of a number of fusiform conidia, and many similar hyphæ were seen on the surface of the surrounding wood, bearing the same masses of conidia, and presenting the appearance of a species of *Acrotheca*.

The following is a description of the fungus, drawn up from my specimens :—

Cups rather crowded, 1½–1 mm. across, sessile, at first globose, then hemispherical and flattened; disk at length nearly plane, dull brown, edge slightly elevated; exterior densely pilose, with flexuose brown hairs, paler than the disk; hairs cylindrical, septate, pale brown below, paler upwards, slightly swollen and nearly hyaline above the upper septum, crisped when dry, often inclined at the tip, averaging 100 × 4 μ; many, especially round margin of cup, bore at the faintly denticulate apex a shining-white irregular mass about 15–20 μ thick, consisting of fifteen to thirty conidia. Asci cylindrical, 60 × 5 μ, apex rounded; paraphyses slightly longer, 70 μ, hyaline, lanceolate, apex very acute, 3–3½ μ thick at widest part; spores biseriate, hyaline, oblong-fusoid, about 11–12 × 2 μ, showing a tendency to become uniseptate.

Acrotheca canescens Grove. — Hyphæ as above. Conidia hyaline, oblong-fusoid, somewhat acute at the ends, 10–12 × 3 μ.

It will be seen that the conidia were almost exactly like the ascospores, differing only in being rather stouter, and not presenting, so far as seen, any appearance of a septum. The hyphæ which grew upon the neighbouring wood were more thickly scattered, and sometimes shorter, but otherwise extremely similar to the hairs of the cup.

Of the connection of the conidia with the *Dasyscypha* there cannot be the slightest question, as the hairs of the cup on which they grew were undistinguishable from the other hairs that clothed it, and were seen to rise from the cells of the excipulum. The number of cups found presenting this phenomenon was several

hundreds. It seems likely that the name *canescens* was suggested to Cooke by this hoary coating, as the few non-conidiiferous cups were of a nearly uniform brown.

2. Coryne urnalis Sacc. Mass. F. F. iv. 153. (Fig. 2.)
Ombrophila purpurea Phill. Disc. 324.
Bulgaria purpurea Cooke, Grev. ii. 163.

There is considerable interest attached to the species of *Coryne*, because some of them present the unusual character of bearing in their asci two kinds of spores; the relation of these spores to one another is an open question.

The same phenomenon occurs in the Discomycetous genus *Tympanis*. Similarly, among the Pyrenomycetes, some species of *Nectriacei* are met with, having apparently the same external appearance, but bearing sometimes eight spores, at another time innumerable smaller ones, in an ascus. Some authorities, as Tulasne, consider these two forms in each case as belonging to the same species; others, as Saccardo, state that they are recognisably distinct, even in external appearance.

Last December I received from Aberystwith, by the courtesy of Dr. J. H. Salter, some specimens of *Coryne urnalis* in which the two kinds of spores were present in large numbers. If a fragment of the hymenium was crushed under a cover-glass, the field was crowded with spores of both kinds. On cutting sections, it was noticed that most of the asci contained the usual elliptic-fusoid spores, measuring 25–30 × 5 μ; the contents of these were very granular, and many of them were distinctly 5 or 6 septate (fig. 2*f*.) Paraphyses fasciculate at base, linear, granular, always longer than the asci.

But here and there an ascus presented the peculiar appearance shown in fig. 2*c*. There were four of the fusoid spores, alternating with the same number of groups of minute globose spores ($2\frac{1}{2}$ μ diam.), about twenty in each group. Moreover, these bodies resembled very closely (except that they were more regular in size) the granular contents of some of the larger spores.

When section after section was examined and showed the same arrangement, it became evident that the groups of small spores simply replaced a single larger one, the protoplasm which should have formed the latter being broken up into about twenty smaller portions, each of which surrounded itself with a cell-wall. Thus the microspores, though in appearance and refractive power like the granular masses seen within an unseptate megaspore, were more distinct in outline as well as more regular in size.

But it seemed impossible to conceive of any reason for this peculiar formation, since the other four megaspores were exactly of the same character as when the normal eight spores arose in the ascus. Since, in addition, some of the cups produced, not asci, but hyphæ bearing huge numbers of minute allantoid conidia, 5 × 1 μ (fig. 2*e*), it will be seen that this species produces three very different kinds of spore.

3. Eleutherosphæra longispora Grove. (Fig. 3.)

Eleutheromyces longisporus Phill. & Plow. Grev. xiii. 78 (1885); Sacc. Syll. Addit. p. 195 (1886).

In July I found at Studley, on the the top of an oak stump, a large chrome-yellow mass of the plasmodium of a Myxomycete. This was brought to Birmingham and placed under a bell-glass, but owing to the disturbance of the conditions it never developed properly, although a few irregular sporangia were formed.

But, as it decayed, the surface became covered with a fine, white, arachnoid mycelium, much interwoven, with many strands composed of parallel hyphæ (hyphæ reaching 12 μ diam.). At the crossings of these strands there were formed globular or discoidal masses ($\frac{1}{4}$–$\frac{1}{2}$ mm. diam.) of perithecia, the long necks protruding in all directions like the spines of an Actinosphærium, the bases immersed in a slight layer of mucus, twenty to fifty in a cluster.

The perithecia were hyaline and whitish, faintly tinged with yellow when older, globular or ellipsoid below, prolonged into a tapering neck; the venter was formed of large pseudo-parenchyma (cells averaging 10 μ diam.), the cells becoming elongated upwards, and at the tip of the ostiolum these were reduced to six or eight narrow linear cells surrounding the orifice. The point was as sharp as a needle, but soon broke off about half-way down, leaving a stumpy perithecium. Cells individually as clear as glass, colourless, with a few minute nuclei; the wall of the perithecium was only one cell thick everywhere except at the base.

The perithecium, which resembled the archegonium of *Marchantia*, was often empty, but in other cases was filled with delicate asci, which soon became diffluent; asci clavato-fusiform, four-spored; spores fusiform, acute at each end, hyaline, uniseptate, each cell uniguttulate or full of greenish granules which were often arranged in two groups, surrounded by a layer of mucus by which the spores were held together after the diffluence of the asci. Perithecia 450–500 × 60–90 μ; asci 120 × 25 μ; spores 60–70 × 8–10 μ; no paraphyses. There is only room in the perithecium for about eight or ten asci.

This is apparently an extremely rare species; I cannot find any other records of it. It is curious that it was discovered by Plowright in 1882 on the very same kind of habitat as in the present case. The perithecia of my specimens were not so broad, nor were the spores ciliate at each end, as described by Plowright, but otherwise the agreement is perfect. It may, of course, be that the cilia are a later development, but I am inclined to think that the mucus when dried might present the appearance of a cilium at the ends, as in several cases it was seen as shown in fig. 3*e*. But the other end of such a spore was often darker in colour and not ciliate.

The spores are distinctly uniseptate when mature, so that it cannot, according to modern views, be congeneric with *Eleutheromyces subulatus* (Tode), though the similar texture of the perithecia and diffluence of the asci are indications of a close affinity. It is therefore necessary to found for it the genus *Eleutherosphæra*, which is distinguished from *Eleutheromyces* mainly by its septate spores.

Eleutherosphæra, n. g.—Perithecia subglobosa, ostiolo longo subulato, diaphana. Asci fusoidei. Sporidia fusoidea, hyalina, septata.

EXPLANATION OF PLATE 485.

FIG. 1.—*Dasyscypha canescens*—*a*, cup × 50; *b*, asci, paraphyses and spores × 500; *c*, *Acrotheca canescens* × 100; *d*, hyphæ and conidia × 500,

FIG. 2.—*Coryne urnalis*—*a*, immature ascus and paraphyses × 600; *b*, ascus dehisced at apex; *c*, mature ascus, containing four megaspores and about a hundred microspores, flattened by pressure of cover-glass; *d*, spores, face-view below, profile-view above; *e*, hyphæ and conidia × 600; *f*, group of all three kinds of spores × 600.

FIG. 3.—*Eleutherosphæra longispora*—*a*, perithecium × 250; *b*, ascus with spores × 250; *c*, ostiole of perithecium × 600; *d*, unripe spore, *e*, mature spores × 600.

FORMS OF *POTAMOGETON* NEW TO BRITAIN.

BY ARTHUR BENNETT.

1. POTAMOGETON VAGINATUS Turcz. "Foliis omnibus submersis membranaceis pellucidis, basi vaginantibus lineari-setaceis acutis trinerviis, venis transversis destitutis; vaginis laxis; spicis longe pedunculatis, floribus interrupte verticillatis; fructibus oblique obovatis, semiorbicularibus compressis, siccatis dorso obtusis, medioque stria tenui percursis.

"*P. vaginatus* Turcz. Cat. Baic. Dah. n. 1092.

"Præter notas indicatas a præcedente [*P. pectinatus*], quocum a beato Ledebourio injuste conjunctum fuit, habitu robustiore dignoscitur." Turczaninow in Fl. Baicalensi-Dahurica, ii. 2, 162 (1856).

P. pectinatus Ledeb. Fl. Ross. iv. 31 (1853), (pro parte).

P. pectinatus β fluviatilis Schübler & Martens, Fl. Wurtemb. 112 (1834), teste Hochreutiner in Bull. Herb. Boiss. v. 12 (1897). A. O. Kihlman in Meddel. Soc. Fauna et Flora Fenn. xiv. 110 (1887).

P. pectinatus L. subsp. *vaginatus* Magnin in Bull. Soc. Bot. Fr. xliii. 447 (1896). Neuman & Ahlfvengren, Sveriges Fl. 793 (1901).

DISTRIBUTION. *Europe:* Sweden! Archangel, Russia! Switzerland! Austria! Mecklenburg! Finland! *Asia:* Turkestan! Songaria! Irkutsk, *Turczaninow*! *N. America:* Labrador, *Waitz*! in herb. Boissier. Assiniboia, *Macoun*! Buffalo Lake, lat. 56°! Extends north to 64°; Bygdeå, Gulf of Bothnia, and in Finland to 66°, Haaparanta: Hartm. Skand. Fl. ed. 12, 55 (1889). The plant probably occurs in other parts, but its distribution is as yet imperfectly worked out. *Great Britain:* Shetland (co. 112); Tingwall Lock, in Scalloway, Mainland (*W. H. Beeby* sp.!), Aug. 1887.

Differs from *pectinatus* in the loose ample sheaths of the lower leaves, the leaves (always?) without transverse veins, the first smaller, more compressed, and in many the keels are almost obsolete. I possess the plant from fourteen stations, and have seen it

from twelve others. In fruit the heads of fruits are closely agglomerated around the peduncle, and very interrupted.

Other references to it will be found in Hjelt, Consp. Fl. Fennica, 547 (1895); Le Jolis in Mem. Soc. Nat. Cherbourg, xxvii. 294 (1891); Asch. & Graebn. Syn. Fl. Mittel-eur. i. 351 (1897).

2. P. GRACILIS Wolfg. ex Roem. & Schultes. "Caule fluitante, gracili, simplicissimo, debili; foliis omnibus submersis, alternis, remotis, membranaceis, tenuissimus, oblongis lineari-lanceolatisve, obtusiusculis, sessilibus, utrinque attenuatis; pedunculis longissimis, filiformibus; spica brevi, cylindricâ, pauciflorâ. Wolfg. MS. n. 14. Besser in litt." Wolfgang in Roem. & Schult. Syst. Mant. iii. 355 (1827).

P. borealis Kihlman ex Bot. Notiser, 1887, 84.

P. Wolfgangii Kihlman, Herb. Fennica, 34, 128 (1889).

P. salicifolius β lanceolatus Hartm. Skand. Fl. ed. xi. 432 (1879).

P. gramineus f. *Wolfgangii* Neuman & Ahlfvengren, Sveriges Fl. 796 (1901).

P. alpinus × *gramineus* Aschers. & Graebn. Fl. Mitt.-eur. i. 328 (1897).

DISTRIBUTION. *Europe:* Finland, in ten provinces. Russia (*Ingria*). Sweden (*Sundberg* sp. ?). Pomerania (*Erlangen*). Lithuania. Eastern Siberia, Merck in herb. Steven (*Wolfg.* l. c.). *Asia:* Mongolia, Ordos (*Potanin* ! ex *Maximowicz*). Japan (*Faurie* !). *America:* Canada, Lake Hannah, Ontario (*J. Macoun* !). *Great Britain:* "England!" *Aschers. & Graebn.* l. c. *Ireland:* Co. Westmeath and Longford, in the River Inny, July, 1885 (*R. M. Barrington* !).

3. × P. TISELII Richter Pl. Europ. i. 13 (1890). *P. graminea* × *natans* Tis. in Hartm. Hand. Skand. Fl. ed. 12, 48 (1889).

Sweden: Björkgren (*Tiselius* sp.). *Denmark:* Gudena in Jyllandia (*Baagoe* sp.). *Ireland:* Co. Westmeath and Longford. In the River Inny (*Barrington* sp.).

The specimens accord well with the Danish ones, but not so well with the Swedish. Ascherson and Graebner (*op. cit.* p. 333) make two forms of this: *A. per-gramineus*, *B. per-natans*.

I have some doubt whether the Swedish and Danish specimens really belong to the same form. This was recorded doubtfully as *P. fluitans* Roth in Irish Top. Bot. 318 (1901).

4. P. NITENS Weber var. MAXIMUS mihi. This is the plant we have been naming var. *latifolius* Tis. non Fieber, Pot. Böh. 30 (1838). Fieber's plant is simply the type of Weber's *nitens*, and Tiselius's name will not hold. In some states this comes in habit and appearance near to *perfoliatus* L.

I have seen specimens from East Perth (*Sturrock*), Mid Ebudes (*S. M. Macvicar*), and Kerry (*Scully*).

5. P. PUSILLUS L. var. ACUMINATUS mihi. In 1892 Messrs. Kidston and Stirling sent me two sheets of specimens named "*P. acutifolius* Link." They were gathered on the Forth and Clyde Canal in Stirlingshire, June 30th, 1891. They do not belong to Link's species, but it is not easy to place them. In habit they are

between *acutifolius* and the f. *angustissimus* of *P. zosterifolius* Schum. They have the "look" of a North American species, but I know none to which they can be referred: they have the nervation of the *pusillus* series. In 1883 I gathered in a ditch at Acle, near Yarmouth, East Norfolk, a form of *pusillus* that connects this Stirling plant with the type. A still nearer approach to it are specimens gathered by Mr. C. E. Salmon in a ditch near Camber Castle, East Sussex, in 1900; but these are not so far away from the normal *pusillus* as the Stirling plant. After remaining in doubt for some years I propose to name them as above.

Differs from typical *pusillus* by being larger in all its parts, by the long linear acuminate leaves, the stem more compressed.

6. P. PECTINATUS L. var. SALINA Voch. *P. pectinatus* L. var. *pseudomarinus* Ar. Benn. in Trans. Norf. & Norw. Nat. Hist. Soc. 381 (1882). This is a var. of *pectinatus* often named *filiformis*. I have it under that name (or rather *marinus*) from Hungary, Bohemia, &c. In Watson's herbarium it is called "a maritime variety of *P. pectinatus*" by the Rev. K. Trimmer. It seems to be the form that *pectinatus* usually assumes in saline districts in Europe and Asia, whence I have it gathered by Potanin in North China, and Przewalski in West Mongolia. Fries (Nov. Fl. Suec. ed. ii. 53 (1828)) describes a var. *β submarinus*, which may be this plant. I have not been able to see a specimen named by Fries, but have seen one with Voch's name attached, which is certainly the same.

7. P. INTERMEDIUS Tiselius, *Sveriges Flora*, 797 (1901), ex Hagström in Neuman & Ahlfv. In the year 1875 Dr. Boswell Syme gathered in Kirbister Lock, Orphir, Orkney, a series of puzzling plants, which on a scrap of paper placed with them he has named "*P. heterophyllus.*" No doubt they approach closely to that plant, especially in the fruit, yet they are not like any other Scottish *heterophyllus* or *nitens*. The growth of the young plant and the fascicles of curved leaves in the leaf-axils are very like *nitens*. Of specimens sent to Dr. Tiselius, he said: "I believe it rather to be *P. gramineus*. It surely looks like my *intermedius*." The specimens vary considerably among themselves. The plant produces floating leaves on long peduncles. I have a similar plant from Lock of Banles, Birsay, Orkney, J. W. H. Traill, 1888. It may be called *P. heterophyllus* Schreb. var. *intermedius*.

8. In the year 1882 the late Mr. Sturrock, of Rattray, sent me specimens from the Lunan Burn, and from a loch near, that I have never been able to name. The plants need studying *in situ*, but so far as dried specimens allow one to judge, they come near to a rare hybrid named × *P. Lundii* by Richter (Pl. Europææ, i. 13 (1890)), and considered by Almquist* to be "*P. graminea* × *prælonga*," and found in Småland, Sweden. It seems impossible to doubt that *prælongus* is represented in them, especially in the lower leaves and stipules, while in the barren shoots *heterophyllus* seems apparent. The flowers all seem imperfect, mostly closed, and so lend themselves to hybridity, but they should be grown and watched.

* See Hartm. Skand. Fl. ed. 12, 49.

9. P. PRÆLONGUS Wulf. I have as yet seen no British specimens of the extreme states of this species, *i.e. brevifolius* Celak., or the Swedish plant with leaves twelve inches long!—f. *elegans* Tis.; but a very narrow-leaved form (eight inches long) occurs in Cauldshiels Loch, Roxburgh (*A. Brotherston*), and in Kinardlochy Loch, alt. 1250 ft., in Mid Perth (*W. F. Miller*). This I take to be the "var. β foliis angustioribus" of Hooker's Brit. Fl. ed. 3, 77 (1835), judging from specimens in the Kew Herbarium.

10. P. FRIESII Rupr. × P. ACUTIFOLIUS Link? A specimen from Wretton Fen, West Norfolk (Boswell herbarium ex Mr. F. J. Hanbury), is probably the above, but the material I possess is poor, and it must be gathered and studied *in situ*. I believe about twenty-five acres of the fen are still existent, as this was awarded to the poor for turf-cutting at the enclosure.

11. P. UNDULATUS Wolfgang in Roem. & Schult. Syst. Veg. Mant. iii. 360 (1827). For a note on this (the true plant) see Ann. Scott. Nat. Hist., April, 1907, 104.

12. P. ALPINUS Balbis × P. PRÆLONGUS Wulf.? In the Canal Odiham, North Hants, 27, 6, 1880 (*Miss Charlotte E. Palmer*). I wrote to Miss Palmer respecting these specimens, and she kindly sent me specimens in 1904, "gathered within one hundred yards of those in 1880." These proved to be *alpinus*, but the flowers seemed all sterile. I could not find a fruit formed on any of the spikes, yet *alpinus* is one that fruits freely. This, of course, points to a state of *alpinus* rather than a hybrid, but the 1880 specimens are decidedly different in habit and leaf-structure. Miss Palmer names *natans*, *perfoliatus* in plenty, and *pectinatus* as growing in the canal near, and suggests "*alpinus* × *perfoliatus*," but I do not think this can be so. I am not aware that this hybrid has occurred: neither do I recollect ever having seen the two species in juxtaposition. There is no record of *P. prælongus* from the canal in Surrey, and it is not given by Mr. Townsend for Hants. It is a species not recorded for the southern counties of England, though I should expect it to occur in some of the larger ponds of Hants (*i.e.* Fleet or Sowley, &c.). The early date is ,not against it, as I have specimens from Anglesea with ripe fruit gathered in June, In the specimens the flowers are dropping off at this early date (in June).

13. P. ALPINUS Balb. var. δ LACUSTRIS Marss. "Caule internodiisque valde elongatis: foliis natantibus minimis sæpe deficientibus, submersus angustis elongato- vel lineari-lanceolatis undulatis" (Marsson, Fl. Neu-Vorpomm. und Rugen, 490 (1869)). (*Herb. Buchanan*!).

Hab. Lunan Burn, East Perth, July, 1882 (*J. Sturrock*).

The typical plant grows in the same burn, and was gathered at the same date.

14. P. UPSALIENSIS Tiselius in Bot. Notiser, 1884, 15. *P. decipiens* Nolte in part ex Asch. & Graebn. *op. cit.* 332. One specimen sent me by the late Mr. Sturrock from "the Earn above Forteviot, West Perth, 18. 7. 1881. leg. Dr. Buchanan White": it should be searched for by Perth botanists.

15. P. OBTUSIFOLIUS Mert. & Koch. var. FLUVIALIS Lange & Mortensen in Bot. Tidsskr. x. 200 (1878). In describing the type our British floras say, "peduncle about as long as the spike," or "peduncle very short"; though Hooker & Arnott (Brit. Fl. ed. 8, 480 (1860)) remark, "occasionally the peduncle is double the length of the spike." In the var. *fluvialis* the peduncles are sometimes $2\frac{1}{4}$ in. long. In the original description of the species in Röhlings Deutschl. Fl. i. 855 (1823), the peduncle is given as short, "about as long as the spike." It is likely that Fries's var. *lacustris* (Herb. Norm. v. no. 81 (c. 1840), Summ. Veg. Scan. 68 (1846)) is the same as *fluvialis*, as he speaks in his Nov. Fl. Suec. 48 (1828) of a form occurring in deep lakes, with the stems elongated (two feet long), and with more slender stems than the type. Ascherson & Graebner do not mention either of these forms. Chamisso in *Linnæa*, ii. 179 (1827) describes a "forma elongata" with a stem three feet long in deep water, but no mention is made of the length of the peduncle.

SYNOPSIS OF THE ORDERS, GENERA, AND SPECIES OF MYCETOZOA.

By A. and G. Lister.

A considerable number of new species of Mycetozoa have been recorded since the publication of the British Museum Catalogue in 1894. Most of these have been described or referred to in this Journal, and the list now offered includes all those that have come under our observation up to the present time; it is, however, clearly to be understood that it comprises only those species which we have personally examined. With three or four exceptions they are all represented in the British Museum Collection.

The synopsis of the orders and genera in the British Museum Catalogue and that in the Guide to the British Mycetozoa are preceded by introductions in which the technical terms are explained; we hope that either of these introductions will serve to elucidate the terms used on the present occasion.

The colour of the spores is described as seen with transmitted light under a magnifying power of 600 diameters.

The bibliography at the end refers to the additions and alterations which we have seen reason to adopt since the publication of the Catalogue. The species of which there are figures in the papers referred to are marked by an asterisk after the reference-number.

Subclass I.—EXOSPOREÆ. Spores developed outside a sporophore.

Order I. — CERATIOMYXACEÆ. Sporophore membranous, branched; spores white, borne singly on filiform stalks arising from the areolated sporophore. 1. **Ceratiomyxa.**

Subclass II.—ENDOSPOREÆ. Spores developed inside a sporangium.

Cohort I.—AMAUROSPORALES. Spores violet-brown or purplish

grey (ferruginous in *Stemonitis ferruginea* and *S. flavogenita* colourless in *Echinostelium*).

Subcohort I.—Calcarineæ. Sporangia provided with lime (calcium carbonate).

Order I.—Physaraceæ. Lime in the form of minute round granules.

A. Capillitium charged with lime throughout . **2. Badhamia.**

B. Capillitium of hyaline threads with vesicular expansions filled with lime (= "lime-knots").

Sporangia subglobose or in the form of plasmodiocarps; capillitium without free hooked branches . . **3. Physarum.**

Sporangia stalked, shortly cylindrical, tubular . **4. Physarella.**

Sporangia stalked, saucer-shaped . . . **5. Trichamphora.**

Sporangia long, cylindrical, branching; capillitium a close elastic network, with minute lime-knots . . . . **6. Erionema.**

Plasmodiocarps cylindrical, forming a net; capillitium with free hooked branches; lime-knots taking the form of vertical plates . . . . . **7. Cienkowskia.**

Sporangia forming an æthalium . . . . . **8. Fuligo.**

Sporangia of the shape of a covered goblet, ovoid or globose; stalks cartilaginous . . . . . **9. Craterium.**

Sporangia ovoid, shining, clustered; stalks membranous **10. Leocarpus.**

C. Capillitium without lime.

Sporangium-wall opaque . . . . . **11. Chondrioderma.**

Sporangium-wall hyaline . . . . . **12. Diachæa.**

Order II.—Didymiaceæ. Lime in crystals deposited outside the sporangium-wall.

Crystals stellate; sporangia distinct; sporangium-wall membranous (except in *D. leoninum*) . . . . **13. Didymium.**

Crystals stellate; sporangia forming an æthalium **14. Spumaria.**

Crystals in the form of lenticular or stellate scales; sporangium-wall cartilaginous . . . . . **15. Lepidoderma.**

Subcohort II.—Amaurochætineæ. Sporangia without lime.

Order I.—Stemonitaceæ. Sporangia distinct, provided with a stalk and columella.

A. Sporangium-wall evanescent.

Sporangia cylindrical; capillitium spreading from the columella and forming an even superficial net. . **16. Stemonitis.**

Sporangia globose or cylindrical; capillitium spreading from the columella; superficial net wanting or imperfect **17. Comatricha.**

Sporangia globose; capillitium springing only from the apex of the sporangium . . . . . **18. Enerthenema.**

Sporangia very minute; capillitium scanty, colourless, branching from a short columella . . . . . 19. **Echinostelium.**

B. Sporangium-wall more or less persistent.

Sporangium-wall a uniform membrane; capillitium spreading from the columella . . . . . 20. **Lamproderma.**

Sporangium-wall persistent in the form of minute discs at the apices of the rigid forking capillitium threads 21. **Clastoderma.**

Order II.—Amaurochætaceæ. Sporangia combined into an æthalium.

Capillitium irregularly branched . . . 22. **Amaurochæte.**

Capillitium with chambered vesicles . . . . 23. **Brefeldia.**

Cohort II.—Lamprosporales. Spores variously coloured, but not violet-brown or purplish grey (violet in some species of *Cribraria*).

Subcohort I.—Anemineæ. Capillitium wanting, or if present not forming a system of uniform threads (except in *Alwisia*, q.v.).

Order I.—Heterodermaceæ. Sporangium-wall membranous, beset with microscopic round plasmodic granules.

Sporangia æthalioid, the walls not forming a persistent net 24. **Lindbladia.**

Sporangium-wall forming a persistent net . . 25. **Cribraria.**

Sporangium-wall persistent in the form of numerous parallel ribs 26. **Dictydium.**

Order II.—Liceaceæ. Sporangia solitary; sporangium-wall cartilaginous (membranous in *Licea biforis*).

Sporangia solitary, sessile . . . . . 27. **Licea.**

Sporangia stalked, furnished with a lid of thinner substance 28. **Orcadella.**

Order III.—Tubulinaceæ. Sporangium-wall membranous, without microscopic plasmodic granules; sporangia clustered, cylindrical or ellipsoid.

Sporangia cylindrical, compacted, without pseudo-columella 29. **Tubulina.**

Sporangium-wall with tubular extensions connecting it with a hollow pseudo-columella . . . . 30. **Siphoptychium.**

Sporangia stalked, ellipsoid, with a brush of tubular threads attached above and below to the sporangium-wall 31. **Alwisia.**

Order IV.—Reticulariaceæ. Sporangia combined into an æthalium; their walls incomplete, perforated or forming a spurious capillitium.

Sporangia columnar . . . . . 32. **Dictydiæthalium.**

Sporangia convolute; inner sporangium-walls reduced to broad bands . . . . . 33. **Enteridium.**

Sporangia convolute; inner sporangium-walls laciniate 34. **Reticularia.**

Order V.—Lycogalaceæ. Sporangia forming an æthalium; pseudo-capillitium consisting of branched colourless tubes . . . . . 35. **Lycogala.**

Subcohort II.—Calonemineæ. Capillitium present as a system of uniform or sculptured threads.

Order I.—Trichiaceæ. Capillitium consisting of free tubular threads ("elaters"), or a network branching at wide angles, with thickenings in the form of spirals or rings.

Elaters free, spirals distinct . . . . . 36. **Trichia.**

Threads free, scanty, spirals obscure . . . 37. **Oligonema.**

Capillitium combined into a network of threads with distinct spiral thickenings . . . . . 38. **Hemitrichia.**

Capillitium a network with thickenings in the form of rings 39. **Cornuvia.**

Order II.—Arcyriaceæ. Capillitium a network of tubular threads branching at wide angles and thickened with cogs, half-rings, spines, or warts (usually scanty and of free threads in *Perichæna populina*).

A. Capillitium elastic:—

Sporangia stalked; sporangium-walls evanescent above 40. **Arcyria.**

B. Capillitium not elastic:—

Sporangia sessile or shortly stalked, clustered, the walls single, persistent . . . . . 41. **Lachnobolus.**

Sporangia sessile, rarely stalked, the wall usually double, persistent . . . . . 42. **Perichæna.**

Order III. — Margaritaceæ. Capillitium of solid threads coiled and hair-like, or straight and attached to the sporangium-wall, simple or branching at acute angles.

A. Sporangia dehiscing irregularly:—

Threads profuse, coiled . . . . . 43. **Margarita.**

Threads straight . . . . . 44. **Dianema.**

Threads penicillate, spirally banded . . . 45. **Prototrichia.**

B. Sporangia dehiscing in lobes:—

Threads with moniliform thickenings . . . 46. **Listerella.**

Subclass I.—EXOSPOREÆ.

Order I.—Ceratiomyxaceæ.

1. **Ceratiomyxa** Schroeter. Surface of sporophores mapped out into polyhedral areolæ, from the centre of each of which arises a slender stalk bearing a single ellipsoid spore

C. mucida Schroeter.

Subclass II.—ENDOSPOREÆ.

Cohort I.—Amaurosporales.

Subcohort I.—Calcarineæ.

Order I.—Physaraceæ.

2. **Badhamia** Berkeley. Sporangium-wall membranous, containing lime-granules; capillitium a coarse network charged throughout with granules of lime; spores clustered or free.

A. Spores clustered:—

a. Spores warted on one side chiefly—

α. Sporangia 1 to 1·5 mm. diam.—

* Lime in sporangium and capillitium white—

Plasmodium orange, sporangia grey, clustered or scattered . . . . . **B. hyalina** Berk.

Plasmodium white, sporangia white, heaped **B. populina** List. (18, p. 129*).

** Lime in sporangia and capillitium yellow **B. nitens** Rost.

β. Sporangia 0·3 to 0·5 mm. diam., capillitium white or apricot-coloured . . **B. versicolor** List. (15, p. 81*).

b. Spores equally warted all over . . . **B. utricularis** Berk.

B. Spores not clustered:—

a. Sporangia yellow or orange . . . . **B. decipiens** Berk.

b. Sporangia white or grey—

Sporangia globose on long membranous stalks, spores nearly smooth, blackish . . . . . **B. magna** Peck

Sporangia subglobose sessile or with firm yellow or brown stalks, spores closely spinulose, dark purple-brown **B. macrocarpa** Rost.

Sporangia discoid, depressed, on short black stalks, spores violet-brown . . . . . **B. orbiculata** Rex

Sporangia subglobose, sessile, spores violet-brown, nearly smooth, plasmodium white . . . **B. panicea** Rost.

Sporangia globose sessile or on short membranous stalks; spores violet-brown, plasmodium orange **B. foliicola** List. (9, p. 209).

c. Sporangia sessile, hemispherical, or forming plasmodiocarps, chalk-white; spores smooth, ellipsoid **B. ovispora** Racib. (10, p. 354*).

C. Sporangia flesh-coloured or purple-brown:—

Sporangia sessile, without a true columella **B. lilacina** Rost.

Sporangia stalked, stalk continued into the sporangium as a columella . . . . . **B. rubiginosa** Rost.

3. **Physarum** Persoon. Sporangium-wall membranous, with incorporated ("innate") deposits of lime in round granules,

either in clusters or densely compacted; capillitium a network of delicate threads containing lime-knots.

A. Sporangia stalked (occasional sessile forms) :—

a. Stalks charged with lime throughout—

α. Capillitium lax—

Stalk white, sporangia grey, lime-knots large white, columella none . . . . . **P. leucopus** Link

Stalk white, rarely rufous, sporangia tawny yellow, globose, columella conical . . . . . **P. melleum** Mass.

Stalk olive or yellowish, short or absent, sporangia olive or yellow, globose, ovoid or forming plasmodiocarps, columella none . . . . . **P. variabile** Rex

Stalk and sporangium pale yellow, columella large hemispherical . . **P. luteo-album** List. (18, p. 130*).

β. Capillitium rigid, persistent—

Stalk white or brownish below, sporangium white, lime-knots small, white . . . . **P. globuliferum** Pers.

Stalk, sporangium, and lime-knots red **P. pulchripes** Peck

" " " mouse-brown **P. murinum** List.

" " " purple **P. pulcherrimum** Berk. & Rav.

" " " yellow, robust **P. citrinum** Schum.

" " " straw-coloured, slender **P. tenerum** Rex

Stalk and sporangium white, capillitium with a central ball of lime . . . . . **P. compactum** List.

b. Stalks without lime, or with deposits in the wall only—

α. Lime-knots purple-red, sporangium rose-red **P. roseum** Berk. & Br.

β. Lime-knots and sporangium violet-purple **P. Newtoni** Macbr.

γ. Lime-knots orange, sporangium glossy, mottled blue and red, stalk red or orange . . . **P. psittacinum** Ditm.

δ. Lime-knots orange, sporangium bronze, stalk black, spores reticulated . **P. dictyospermum** List. (19, p. 112).

ε. Lime-knots yellow or orange; sporangium yellow, orange, or grey—

Sporangia subglobose, stalked; capillitium lax, lime-knots fusiform . . . . . **P. viride** Pers.

Sporangia contorted, stalked, usually clustered; capillitium lax, lime-knots fusiform . **P. polymorphum** Rost.

Sporangia subglobose, stalks red-brown, slender, lime-knots angular . . . . . **P. Berkeleyi** Rost.

Sporangia subglobose; stalks brown, short or absent, lime-knots large and branching
P. auriscalpium Cooke (11, p. 115).
Stalk penetrating the sporangium for four-fifths its height
P. penetrale Rex

ζ. Lime-knots white; sporangia grey—

* Stalk free from refuse matter—

Stalk straw-coloured; sporangium globose; capillitium with a central ball of lime . **P. nucleatum** Rex
Stalk ochraceous, short or absent, sporangia ovoid or cylindrical, with a long pseudo-columella
P. Crateriachea List. (8, p. 323).
Stalk straw-coloured, slender; sporangia compressed; spores marked with patches of warts
P. straminipes List. (12, p. 163*).
Stalk red-brown; sporangia globose, white
P. calidris List.
Stalk white, membranous, short or absent; sporangia ovoid or subglobose (and then sessile), without pseudo-columella—
Spores very dark all over . **P. didermoides** Rost.
Sporangia always sessile, spores paler on one side
P. didermoides var. **lividum** List. (12, p. 162).

** Stalk containing refuse matter—

Stalk buff, black, or white; sporangia subglobose; spores brownish violet . . . **P. nutans** Pers.
Stalk black, buff, or white, stout; sporangia compressed, often lobed; spores dark purple-brown
P. compressum Alb. & Schw.
Stalk yellowish or dark, slender; sporangia compressed and lobed, often clustered (smaller than *P. compressum*, to which it is very nearly allied)
P. Nicaraguense Macbr.

B. Sporangia sessile, never stalked:—

a. Lime-knots white—

α. Sporangium-wall single—

Sporangia subglobose or forming plasmodiocarps white, or grey, spores pale brownish violet, 7–8 μ diam.
P. cinereum Pers.
Sporangia subglobose or forming plasmodiocarps white, or grey, spores dark violet-brown, 9–11 μ diam.
P. vernum Somm. (9, p. 210).
Sporangia much compressed, forming rosettes or net-like plasmodiocarps, lime-knots fusiform
P. gyrosum Rost. (16, p. 210*).
Sporangia crowded, chestnut-brown
P. Gulielmæ Penz. (24, p. 34).

β. Sporangium-wall double—

* Sporangia scattered, forming plasmodiocarps—

Plasmodiocarps sinuous, muriform, white; spores marked with strong ridges and spines, brownish purple
P. echinosporum List. (13, p. 147*).

Plasmodiocarps sinuous, muriform, white or buff, inner wall fragile, colourless; spores purple-brown, spinulose . . . . . **P. bivalve** Pers.

Plasmodiocarps sinuous, buff or brown, marked with pale lines of dehiscence; spores pale brownish violet, nearly smooth
P. bogoriense Racib. (11, pp. 117, 122*).

Plasmodiocarps white, usually compressed, inner wall purplish, persistent; spores dark purplish brown, spinulose . . . . . **P. Diderma** Rost.

** Sporangia crowded, reniform or subglobse—

Spores dark, rough, 10–14 *μ* . . **P. contextum** Pers.

Spores pale, nearly smooth, 8–10 *μ*
P. conglomeratum Rost.

b. Lime-knots yellow, red, or brown—

Plasmodiocarps and large branching lime-knots yellow
P. Serpula Morg. (23, p. 101).

Plasmodiocarps and lime-knots brown
P. æneum R. Fr. (3, p. 62; & 11, p. 117*).

Sporangia red or brownish buff; lime-knots large, angular, orange-red or red-brown . **P. rubiginosum** Fr.

Sporangia red; lime-knots rounded, yellow, with usually red centres . . . . . **P. inæquale** Peck

Sporangia yellow or orange; lime-knots angular, yellow
P. virescens Ditm.

4. **Physarella** Peck. Sporangia stipitate, shortly cylindrical, perforated from above by a deep umbilicus; capillitium of delicate threads with minute fusiform lime-knots and stout spine-like processes densely charged with lime granules springing perpendicularly from the sporangium-wall . **P. mirabilis** Peck

5. **Trichamphora** Junghuhn. Sporangia discoid or saucer-shaped, stipitate; stalk red-brown; sporangium-wall membranous, with evenly distributed deposits of lime granules; capillitium consisting of colourless branching threads with many or few lime-knots, or of membranous tubes filled with lime throughout, or without lime . . . . . **T. pezizoidea** Jungh.

6. **Erionema** Penzig. Sporangia forming long cylindrical branched plasmodiocarps, or stalked and drooping, bright yellow; capillitium a close elastic network of slender colourless threads with few small yellow lime-knots
E. aureum Penz. (23, p. 36; & 17, p. 98*).

7. **Cienkowskia** Rostafinski. Sporangium-wall cartilaginous at the base; capillitium a loose network of rigid threads with many free curved, sharp-pointed branchlets, connected with flat perforated calcareous plates attached at their margins to the sporangium-wall . . . . . **C. reticulata** Rost.

8. **Fuligo** Haller. Sporangia elongate, branching and interwoven, forming a pulvinate æthalium, often with a barren superficial layer forming a cortex; capillitium as in *Physarum*.

Æthalium and lime-knots yellow, rarely reddish or white; spores 7–8 μ . . . . . **F. septica** Gmel.

Æthalium yellowish grey, lime-knots numerous, orange-yellow; spores 10–11 μ . . **F. muscorum** A. & S. (1, p. 240*). (syn. *F. ochracea* Peck).

Æthalium and lime-knots pure white, the latter large; spores usually ellipsoid, 13 × 16 μ . . . **F. ellipsospora** List.

9. **Craterium** Trent. Sporangium stipitate, goblet-shaped, usually with a lid of thinner substance, or ovoid or globose; sporangium-wall charged with lime and cartilaginous at least in the lower part; stalk cartilaginous, translucent; capillitium of branching hyaline threads connecting large lime-knots which are often confluent in the centre, forming a pseudo-columella.

A. Sporangium-wall smooth, glossy—

Lime-knots white . . . . . **C. pedunculatum** Trent.

Lime-knots brown . . . . . **C. concinnum** Rex

B. Sporangium-wall mealy or rugose—

Sporangia violet . . . . . **C. rubescens** Rex

Sporangia brown, powdered with white in the upper part **C. leucocephalum** Ditm.

Sporangia yellow rugose—

a. Sporangia ovoid, spores 7–9 μ . . **C. mutabile** Fr.

b. Sporangia globose, spores 10–12 μ **C. citrinellum** List.

10. **Leocarpus** Link. Sporangium-wall of two layers, the outer cartilaginous and calcareous, the inner hyaline; capillitium a network of hyaline threads with branched and anastomosing brownish lime-knots . . . . . **L. vernicosus** Link

11. **Chondrioderma** Rost. Sporangium-wall charged with lime in the form of round granules (except in *C. Trevelyani* q. v.); capillitium without lime-knots.

Subgenus 1. **Euchondrioderma.** Outer sporangium-wall a smooth crust composed of lime granules densely compacted (except in *C. simplex*); inner layer membranous.

A. Spores reticulated . . . **C. subdictyospermum** Rost.

B. Spores not reticulated—

a. Sporangia white—

Sporangia disc-shaped, stalked . . **C. Michelii** Rost.

Plasmodiocarps flat; columella brownish flesh-coloured
C. reticulatum Rost.

Sporangia hemispherical; columella white, convex; inner sporangium-wall rarely persistent; spores violet-brown, 7–10 μ . . . . **C. spumarioides** Rost.

Sporangia subglobose; columella small, convex, white; inner sporangium-wall persistent, colourless; spores purplish brown, 11–14 μ . . **C. globosum** Rost.

Sporangia subglobose or ovoid (or forming plasmodiocarps in var. *deplanatum*); columella subglobose or clavate, orange, red-brown, or pale, absent in plasmodiocarp forms; inner wall persistent, orange below; spores purplish brown, 9–14 μ . . . . **C. niveum** Rost. (including *C. Lyallii* Mass.).†

b. Sporangia flesh-coloured, depressed **C. testaceum** Rost.

c. Sporangia reddish clay-coloured or brownish buff, wall single . . . **C. simplex** Schroet. (15, p. 85*).

Subgenus 2. **Leangium**. Sporangium-wall cartilaginous.

A. Sporangium-wall brown externally, white and crystalline on the inner side; columella none
C. Trevelyani Rost.

B. Sporangium-wall without a crystalline layer—

a. Spores with widely scattered warts, sporangia stalked
C. floriforme Rost.

b. Spores closely spinulose or nearly smooth—

Sporangia pinkish brown, sessile, subglobose; columella indefinite; capillitium usually colourless
C. Sauteri Rost.

Sporangia ochraceous, sessile, subglobose or ring-shaped; columella indefinite; capillitium purple-brown
C. ochraceum Schroet. (20, p. 150; & 15, p. 88).

Sporangia brown, marked with close radiating dark lines, sessile, hemispherical; columella white, prominent
C. asteroides List. (16, p. 209*).

Sporangia grey or pale brown; columella pale, hemispherical; stalk stout, ochraceous
C. radiatum Rost.

Sporangia mottled brown; columella convex, ochraceous; stalk black . . . . . **C. roanense** Rex

Sporangia and clavate columella white; stalk slender, black . . . . . **C. rugosum** Rex

Sporangia bright orange; columella clavate; stalk slender, dark brown . . . . . **C. lucidum** Cooke

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† Numerous alpine gatherings showing intermediate forms prove that *C. Lyallii* cannot be regarded as more than a variety of *C. niveum*.

12. **Diachæa** Fries. Lime present in stalk and columella, rarely wanting; entirely absent from the purple capillitium and iridescent sporangium-wall.

A. Sporangia globose:—

a. Lime in stalk white.

Spores with dark raised bands and tubercles **D. splendens** Peck

Spores spinulose . **D. bulbillosa** List. (12, p. 165*).

Spores delicately reticulated **D. subsessilis** Peck (9, p. 213, & 12, p. 166*).

b. Lime in stalk orange . . . . . **D. Thomasii** Rex

B. Sporangia cylindrical:—

Spores nearly smooth; lime in stalk white **D. elegans** Fr.

Spores delicately reticulated; lime absent in the two recorded gatherings **D. cylindrica** Bilgram (2, p. 524).

Spores warted; lime usually absent **D. cæspitosa** List. (syn. *Comatricha cæspitosa* Sturgis).†

Order II.—Didymiaceæ.

13. **Didymium** Schrader. Sporangia stalked or sessile; lime-crystals either scattered on the membranous sporangium-wall, or closely combined and forming a crust; capillitium often thickened at intervals with dark nodes.

A. Superficial crystals closely combined to form a thin egg-shell-like crust:—

Sporangia sessile, pulvinate; capillitium threads scanty, broad at the base . . . . . **D. difforme** Duby

Capillitium profuse, slender throughout **D. difforme** var. **comatum** List. (14, p. 8).

Sporangia sessile, flat; capillitium rigid, dark, profuse, slender at the points of attachment . . **D. dubium** Rost.

Sporangia turbinate, shortly stalked; capillitium rigid, colourless . . . . . **D. Trochus** List. (12, p. 164*).

B. Superficial crystals scattered, or loosely combined:—

a. Plasmodiocarps; capillitium associated with large olive-coloured vesicles . . . . . **D. Serpula** Fr.

b. Sporangia usually stalked; capillitium without vesicles; spores more or less spinulose—

α. Sporangia disc-shaped with dark stalks **D. Clavus** Rost.

β. Sporangia subglobose or effused—

Stalk and columella dark brown; stalk opaque and granular **D. farinaceum** Schrad.

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† Further experience inclines us to regard this form as a species of *Diachæa* distinct from *D. Thomasii*.

Stalk olive-brown or orange, translucent, not granular
D. nigripes Fr.

Stalk and columella white; crystals on sporangium-wall scattered or forming a wrinkled crust; sporangia often effused . . . . . **D. effusum** Link

Stalk short membranous, pale buff; crystals on sporangium-wall forming a smooth, thick, deciduous envelope
D. crustaceum Fr.

Stalk and columella orange or orange-brown; sporangium-wall cartilaginous, areolated, orange or orange-brown
D. leoninum Berk. & Br.†

C. Sporangia with orange stalks; sporangium-wall hyaline; spores dark brown, closely reticulated (nearly allied to *D. effusum*)
D. intermedium Schroet. (5, p. 209).

14. **Spumaria** Persoon. Sporangia confluent, forming an æthalium, enclosed in a mass of white lime-crystals; the other characters as in *Didymium*.

Sporangia elongate and lobed; spores strongly spinulose
S. alba DC.

Spores closely reticulate
S. alba var. dictyospora R. Fr. (3, p. 66).

15. **Lepidoderma** De Bary. Sporangium-wall cartilaginous, beset with superficial crystalline discs or scales; capillitium usually rigid, without lime (except in *L. Carestianum* var. *granuliferum* List., q. v.).

Sporangia with orange stalks . . . . . **L. tigrinum** Rost.

Sporangia subglobose or hemispherical, sessile, rarely with short grey-brown stalks, or forming plasmodiocarps
L. Carestianum Rost.
(including **L. Chailletii** Rost. (25, p. 63)).

Plasmodiocarps; capillitium containing lime in the form of rounded nodules
L. Carestianum var. **granuliferum** List. (25, p. 63).
(syn. *Didymium granuliferum* Phill.;
Lepidoderma granuliferum R. Fr. (4, p. 3)).

Subcohort II.—Amaurochætineæ.

Order I.—Stemonitaceæ.

16. **Stemonitis** Gleditsch. Sporangia cylindrical stipitate, fasciculate; stalk continued as a columella to near the apex of the sporangium; capillitium radiating from all parts of the columella, the ultimate branches normally uniting to form an even superficial net.

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† Further extensive gatherings made by Mr. Petch in Ceylon confirm the integrity of Berkeley & Broome's species, and show it to be distinct from *Lepidoderma tigrinum*.

A. Spores grey, violet-grey, or rufous violet :—

a. Spores reticulated, surface net of capillitium with angular meshes . . . . . **S. fusca** Roth.

b. Spores minutely warted, almost smooth—

Meshes of surface net rounded, 20–100 μ or more wide (imperfect in var. *flaccida*) . . . **S. splendens** Rost.

Meshes of surface net angular, less than 20 μ wide ; spores 7–8 μ diam., sometimes ferruginous ; plasmodium white **S. herbatica** Peck

B. Spores pale ferruginous :—

Spores 7–9 μ diam. ; plasmodium yellow **S. flavogenita** Jahn. (6, p. 165).

Spores 4–6 μ diam. ; plasmodium white **S. ferruginea** Ehrenb.

17. **Comatricha** Preuss. Sporangia subglobose or cylindrical, stalked, gregarious ; capillitium spreading from the columella ; superficial net wanting or imperfect.

A. Spores rather dark brownish violet or grey :—

a. Spores nearly smooth—

Capillitium dense, crisped or flexuose throughout ; on wood . . . . . **C. obtusata** Preuss.

Capillitium with primary branches stout and nearly straight ; on wood . . . . . **C. laxa** Rost. (closely allied to *C. obtusata*).

b. Spores spinulose or reticulated—

α. Sporangia globose ; columella ending in strong branches continued into the flexuose network of the capillitium ; spores warted ; on leaves . . . **C. lurida** List.

β. Sporangia long, slender, cylindrical—

Spores reticulated . . . . . **C. longa** Peck

Spores spinulose . . . . . **C. irregularis** Rex

B. Spores pale ; lilac or reddish lilac :—

a. Spores marked with a few widely scattered warts, otherwise smooth or (in var. *heterospora*) delicately reticulated, 4–6 μ diam. ; on wood (var. *microspora* on leaves) **C. typhoides** Rost.

b. Spores minutely spinulose or nearly smooth, 6–10 μ diam.—

Sporangium-wall completely evanescent ; on leaves (on wood in var. *gracilis*) . . . . . **C. Persoonii** Rost.

Sporangium-wall persistent at the base as a membranous cup, to which the capillitium is attached ; on leaves **C. rubens** List.

18. **Enerthenema** Bowman. Sporangia stipitate ; columella reaching to the summit of the sporangium ; capillitium springing from the superficially extended apex of the columella . . . . . **E. elegans** Bowm.

19. **Echinostelium** De Bary. Sporangia stalked, very minute, 50 μ diam., colourless; capillitium branches few, arising from the apex of a short columella . . . **E. minutum** De Bary

20. **Lamproderma** Rostafinski. Sporangia stalked, globose or ellipsoid (sessile in *L. Lycopodii*); sporangium-wall membranous, somewhat persistent, shining, iridescent; stalk black; capillitium of branching and anastomosing threads spreading from the upper part of the columella.

A. Sporangia stalked; spores more or less spinulose:—

a. Spores echinulate, 15–20 μ . . . **L. echinulatum** Rost.

b. Spores spinulose, or nearly smooth—

α. The dark flexuose capillitium arising by a few (6–9) branches from the apex only of the columella; spores smooth . . . . . **L. arcyrionema** Rost.

β. Capillitium spreading in very numerous branches from the abruptly ending columella—

Capillitium threads dark, pale at the base **L. irideum** Mass.

Capillitium purple with hyaline tips; stalk usually 2–3 mm. . . . . **L. physaroides** Rost.

Capillitium pale or brownish purple; stalk 1 mm. or less . . . . . **L. violaceum** Rost.

B. Sporangia sessile; spores reticulated . **L. Lycopodii** Raunk.

21. **Clastoderma** Blytt. Sporangia minute, stalked, brown; sporangium-wall partly evanescent, partly persistent in the form of minute discs at the apices of the rigid forking capillitium threads; columella short or hardly evident **C. Debaryanum** Blytt

Order II.—Amaurochætaceæ.

22. **Amaurochæte** Rostafinski. Æthalia pulvinate, composed of elongate confluent sporangia; lateral sporangium-walls not developed; capillitium rising from the base in irregularly flattened strands, and dividing into many anastomosing branches . . . . . **A. atra** Rost.

23. **Brefeldia** Rostafinski. Æthalia pulvinate, composed of subcylindrical, branched, and confluent sporangia; capillitium of numerous horizontal threads, those of adjacent sporangia uniting on the boundary line, and there forming chambered vesicles. . . . . **B. maxima** Rost.

Cohort II.—Lamprosporales.

Subcohort I.—Anemineæ.

Order I.—Heterodermaceæ.

24. **Lindbladia** Fries. Sporangia either combined to form an æthalium or closely compacted, usually with a strongly deve-

loped spongy hypothallus; sporangium-wall membranous, beset with microscopic dark plasmodic granules.

Sporangia forming an æthalium . . . **L. Tubulina** Fries

Sporangia closely compacted, sessile, or shortly stalked
L. Tubulina var. **simplex** Rex

25. **Cribraria** Persoon. Sporangia globose, stalked; sporangium-wall persistent and usually forming a cup in the lower half, continued above as a net of slender threads more or less thickened at the nodes, evanescent in the meshes; spores nearly smooth.

A. Nodes of the net not thickened:—

a. Sporangia clay-coloured, cup imperfectly defined, sporangium-wall subpersistent above . . . **C. argillacea** Pers.

b. Sporangia red, net close . . . . . **C. rubiginosa** Fr.

c. Sporangia nut-brown or rufous—
Sporangia 0·6 mm. diam., net lax . **C. rufescens** Pers.
Sporangia 0·1 to 0·2 mm. diam . **C. minutissima** Schw.

B. Nodes of net thickened:—

a. Sporangia nut-brown—

α. Cup ribbed, perforated at the margin, merging into the branching nodes. . . . . **C. macrocarpa** Schrad.

β. Cup well-defined, nodes flattened, angular, branching
C. aurantiaca Schrad.

γ. Cup replaced by strong ribs; nodes flattened
C. splendens Schrad.

δ. Cup well-defined or absent, nodes thickened, prominent, numerous—
Nodes with free rays, and connected by delicate threads, many of which are parallel . . **C. intricata** Schrad.
Nodes rounded in outline, without free rays, connected by four to five delicate threads . . . **C. tenella** Schrad.

b. Sporangia dark or red-brown—

α. Stalk two or three times the height of the sporangium; plasmodic granules dark, 1–2 μ diam.
C. pyriformis Schrad.

β. Stalk four to six times the height of the sporangium—
Cup one-third the height of the sporangium, nodes polygonal
C. languescens Rex
Cup minute or absent, nodes rounded, prominent
C. microcarpa Pers.

c. Sporangia purple—
Cup one-third the height of the sporangium, 0·7 mm. diam.
C. purpurea Schrad.
Cup one-half of the sporangium, 0·5 mm. diam.
C. elegans Berk. & Curt.

d. Sporangia violet-blue; sporangia 0·25 mm. diam.
C. violacea Rex

26. **Dictydium** Schrader. Sporangia globose, purple-brown; sporangium-wall with parallel ribs extending from the base to the apex, connected by slender transverse threads
D. umbilicatum Schrad.

Order II.—Liceaceæ.

27. **Licea** Schrader. Sporangia sessile and hemispherical, or forming plasmodiocarps; sporangium-wall cartilaginous (membranous in *L. biforis*); spores olive-brown or nearly colourless.

A. Sporangium-wall cartilaginous:—

Sporangia hemispherical, dehiscing in lobes; spores 9–11 μ
L. minima Fr.

Sporangia pulvinate, dehiscing in lobes; spores 16–20 μ
L. pusilla Schrad.

Plasmodiocarps elongate, 2–4 mm. long, dehiscing irregularly
L. flexuosa Pers.

B. Sporangium-wall membranous; plasmodiocarps about 0·2 mm. long, 0·05 mm. wide, dehiscing by a longitudinal fissure
L. biforis Morg. (22, p. 5*).

28. **Orcadella** Wingate. Sporangia stipitate; sporangium-wall opaque, cartilaginous, granular except in the upper part, where it forms a membranous lid . **O. operculata** Wing.

Order III.—Tubulinaceæ.

29. **Tubulina** Persoon. Sporangia cylindrical, crowded on a common hypothallus; capillitium none.

Sporangia clustered on a broad hypothallus, spores 5–8 μ
T. fragiformis Pers.

Sporangia clustered on a stalk-like hypothallus, spores 3–5 μ
T. stipitata Rost.

30. **Siphoptychium** Rostafinski. Sporangia cylindrical, with tubular threads connecting the wall with a hollow central pseudo-columella . . . . . **S. Casparyi** Rost.

31. **Alwisia** Berkeley & Broome. Sporangia stalked, ellipsoid; sporangium-wall evanescent in the upper half; the lower half at length splitting into lobes bearing the persistent straight threads of the capillitium
A. Bombarda Berk. & Br.

Order IV.—Reticulariaceæ.

32. **Dictydiæthalium** Rostafinski. Æthalium flat, formed of erect columnar sporangia; sporangium-wall incomplete, dome-shaped on the top, continued to the base in four to six straight threads . . . . . **D. plumbeum** Rost.

33. **Enteridium** Ehrenberg. Æthalium composed of confluent interwoven sporangia, their walls perforated with large openings.

Spores warted, usually clustered . . . **E. olivaceum** Ehrenb.
Spores reticulated, free . . . . . **E. Rozeanum** Wing.

34. **Reticularia** Bulliard. Æthalia composed of interwoven sporangia; the persistent portions of their walls rusty brown, forming broad membranous folds and strands, dividing above into narrow threads.

Æthalia large, at first enclosed by a silvery cortex; spores faintly reticulated . . . . . **R. Lycoperdon** Bull.
Æthalia small, shining iridescent; spores sharply reticulated **R. lobata** List.

(This species is closely allied to *Enteridium Rozeanum*.)

Order V.—Lycogalaceæ.

35. **Lycogala** Micheli. Æthalia subglobose, with a cortex consisting of two more or less closely combined layers, and provided with cell-like vesicles; pseudo-capillitium tubes thick-walled where they traverse the cortex, thin-walled amongst the spores; spores in mass pale pinkish grey.

A. Cortex of æthalium smooth or areolated **L. flavo-fuscum** Rost.
B. Cortex of æthalium warted:—
Æthalia globose . . . . . **L. miniatum** Pers.
Æthalia conical . . . . . **L. conicum** Pers.

Subcohort II.—Calonemineæ.

Order I.—Trichiaceæ.

36. **Trichia** Haller. Sporangia stalked or sessile; elaters free, pointed at each end, thickened with two to five spiral bands; spores reticulated or warted, in the former case the reticulation continuous or broken and forming when seen in profile a "border" to the spore.

A. Spores reticulated or marked with broken bands:—
Elaters 7–8 μ wide; spores reticulated; border 2 μ wide **T. favoginea** Pers.
Elaters 4–5 μ wide; spores reticulated with narrow bands; border 1 μ wide; sporangia stalked, clustered **T. verrucosa** Berk.
Elaters 4–6 μ wide; spores reticulated with broad pitted bands; border 0·5–1 μ wide; sporangia sessile **T. affinis** De Bary
Elaters 4–6 μ wide; spores with the reticulation broken into irregular shallow pitted warts; border interrupted, 0·5 μ wide; sporangia sessile . . . . **T. persimilis** Karst.
Elaters 4–6 μ wide; spores very closely reticulated; border none; sporangia sessile . . . . . **T. scabra** Rost.

B. Spores minutely warted (sometimes minutely reticulated in *T. fallax*) :—

a. Spirals of elaters two . . . . . **T. varia** Pers.

b. Spirals of elaters three or more—

α. Elaters shortly tapering at the ends.

Sporangia sessile, wall uniformly thickened with granular matter; elaters smooth or spinulose **T. contorta** Rost.

Sporangia sessile, wall without granular thickening; spirals or elaters faint . . **T. lutescens** List. (9, p. 216).

Sporangia stalked, wall membranous, thickened in rounded areas with granular deposits; elaters spinose **T. erecta** Rex

β. Elaters smooth, very gradually tapering at the ends—

Stalk hollow, filled with spore-like cells **T. fallax** Pers.

Stalk solid . . . . . **T. Botrytis** Pers.

37. **Oligonema** Rostafinski. Sporangia minute, densely clustered or heaped, sessile; threads more or less scanty, spiral bands obscure; spores reticulated.

Sporangia globose, heaped together; sporangium-wall smooth; spores irregularly reticulated . . . . **O. nitens** Rost.

Sporangia ovoid, crowded; sporangium-wall with minute granular thickenings; spores regularly reticulated **O. flavidum** Peck (18, p. 187).

Threads more or less combined into a network, faintly reticulated and marked with scattered rings, spines, and indefinite spiral bands; spores closely and regularly reticulated **O. flavidum** var. **aureum** List. (18. p. 138)† (syn. *Calonema aureum* Morg.)

38. **Hemitrichia** Rostafinski. Sporangia stalked or sessile; capillitium an elastic network of branching threads, thickened with two to six spiral bands; spores minutely warted or reticulated.

A. Spores nearly smooth, or minutely warted:—

a. Capillitium red, spinose . . . . . **H. rubiformis** List.

b. Capillitium yellow or yellow-brown—

α. Sporangia stalked—

Stalk solid . . . . . **H. intorta** List.

Stalk hollow, filled with spore-like cells—

Cup papillose . . . . . **H. clavata** Rost.

Cup smooth . . . . . **H. leiocarpa** List.

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† The characters shown in the four specimens of *Calonema aureum* we have seen do not in our opinion present specific distinction from forms of *O. flavidum*, of which species it would appear to be a variety.

β. Sporangia sessile—

Spirals of capillitium one to three, prominent, sporangium-wall membranous . . . . . **H. Wigandii** List.

Spirals of capillitium three or more, indistinct; sporangium-wall thickened with granular deposits **H. Karstenii** List.

B. Spores reticulated :—

Capillitium threads spinose . . . . **H. Serpula** Rost.

Capillitium threads smooth . . . **H. chrysospora** List.

39. **Cornuvia** Rostafinski. Sporangia sessile; capillitium a network of threads with thickenings in the form of simple rings; spores reticulated . . . . . **C. Serpula** Rost.

Order II.—Arcyriaceæ.

40. **Arcyria** Hill. Sporangia stalked; sporangium-wall evanescent above, persistent below as a membranous cup; stalk filled with spore-like cells; capillitium with thickenings in the form of half-rings, cogs, spines, or broken reticulation, rarely with three to five faint spiral lines in addition.

A. Spores 9–11 μ diam.; sporangia orange-red or buff:—

Sporangia ovoid; wall reticulated . **A. ferruginea** Sant.

Sporangia clavate; wall papillose . **A. versicolor** Phill.

B. Spores 6–8 μ diam. :—

a. Capillitium attached to the cup—

Sporangia clavate, grey or yellowish; capillitium closely spinulose or warted . . . . . **A. albida** Pers.

Sporangia globose, yellow; capillitium with spines arranged in an open spiral . . . . . **A. pomiformis** Rost.†

Sporangia globose, white, on slender stalks; capillitium closely spinulose or warted, the warts usually arranged in more or less spiral lines . . . . . **A. globosa** Schwein.

Sporangia red, ovoid or subcylindrical; capillitium marked with cogs and half-rings . . . . . **A. punicea** Pers.

Sporangia rose-coloured, subcylindrical or turbinate, small; capillitium delicate, marked with transverse bands and minute spines . . . . . **A. insignis** Kalchbr. & Cooke

b. Capillitium free from the cup—

α. Network of mature capillitium expanding, not drooping—

Capillitium marked with cogs and spines only **A. incarnata** Pers.

Capillitium marked with cogs, spines, and three to four indistinct spiral bands in addition . **A stipata** List.

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† There appears to be sufficient ground for separating *Arcyria pomiformis* and *A. globosa* from *A. albida*, and placing them as distinct species.

β. Network of mature capillitium becoming much elongated, drooping—

Sporangia buff; wall evanescent above . **A. flava** Pers.

Sporangia red; wall persistent above in a few shield-like fragments . . . . . **A Œrstedtii** Rost.

41. **Lachnobolus** Fries. Sporangia sessile or shortly stalked, clustered; capillitium a loose network of closely warted threads attached to many parts of the single-layered persistent sporangium-wall.

Sporangia globose, sessile, heaped . . . . **L. circinans** Fr.

Sporangia globose or ellipsoid, clustered, shortly stalked **L. occidentale** Macbr. (21, p. 188*) very closely allied to *L. circinans*.

42. **Perichæna** Fries. Sporangia subglobose, sessile, rarely shortly stalked, or forming plasmodiocarps; sporangium-wall of two layers, the outer thickened with dark granules, which are exceptionally absent in the upper part; single in *P. microspora*; capillitium of slender branching tubular threads, minutely warted, or spinose.

A. Sporangium-wall stout, brown or grey, inner layer smooth:—

Capillitium spinose . . . . . **P. chrysosperma** List.

Capillitium minutely warted, abundant; spores 10–11 μ diam. **P. depressa** Lib.

Capillitium minutely warted or nearly smooth, scanty; spores 12–14 μ . . . . . **P. populina** Fr.

B. Sporangium-wall membranous:—

Sporangia globose or forming plasmodiocarps, yellow or pale umber; inner layer of wall papillose; spores 10 μ **P. variabilis** Rost.

Plasmodiocarps flesh-coloured; spores 6 μ **P. microspora** Penz. & List. (24, p. 76).

Order III.—Margaritaceæ.

43. **Margarita** List. Sporangia globose, with a translucent wall; capillitium a profuse coil of slender hair-like scarcely branching threads . . . . . **M. metallica** List.

44. **Dianema** Rex. Sporangia sessile, or forming plasmodiocarps; sporangium-wall membranous or cartilaginous; capillitium consisting of nearly straight threads, slender at both ends, attached above and below to the sporangium-wall.

A. Sporangium-wall translucent, membranous; spores free:—

Capillitium threads nearly simple, attached to the sporangium-wall by short branches . . . . . **D. Harveyi** Rex

Plasmodiocarps; capillitium threads converging to acuminate points of attachment to the sporangium-wall **D. depressum** List.

B. Plasmodiocarps; the wall granular, cartilaginous; spores clustered . . . . . **D. corticatum** List.

45. **Prototrichia** Rost. Sporangia globose; capillitium threads rising from the base of the sporangium as stout strands marked with spiral thickenings, dividing at length into a pencil of slender branches attached at the tips to the upper part of the sporangium-wall . . . **P. flagellifera** Rost.

46. **Listerella** Jahn. Sporangia hemispherical, 0·2 to 0·3 mm. diam., black, dehiscing in lobes; sporangium-wall membranous with granular deposits; capillitium scanty, of very slender threads marked with moniliform thickenings, attached to the sporangium-wall; spores pale umber
L. paradoxa Jahn (7, p. 538*).

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NOTE ON *COFFEA ENGLERI*, &c.

By K. Krause.

On pp. 114–116 of this Journal Mr. Spencer Moore has given some remarks on the memoir on *Rubiaceæ* from Tropical Africa published by me in Engler's Botan. Jahrb. xxxix. pp. 516–576. In this note he declares that *Coffea Engleri*, described and figured by me (*l. c.* pp. 546–547), is undoubtedly identical with *Tricalysia jasminiflora* (Klotzsch) Benth. et Hook. f., a plant which Peters was the first to collect near Sena, and which, more recently, was observed by Miss Gibbs in the Matopos, close to the locality of *Coffea Engleri*. For several reasons, however, I am unable to adopt this view.

First, as for the number of ovules. I have again examined the ovary; notwithstanding the rather young state of the flowers, I have ascertained that each of the two cells contains only one ovule attached to the common septum. Therefore it seems impossible to refer the plant to *Tricalysia*, a genus having always two or more ovules in each cell. Moreover, in several other points of minor importance our plant does not agree with the character of *Tricalysia*; it differs in the length of the filaments, the form of the anthers, the size of the flowers, the shape of the stipules, in addition to the generic character of the number of ovules mentioned above. With *T. jasminiflora* more especially, to which it was referred by Mr. Spencer Moore, it has very little in common, as may be seen by looking only superficially to the type of Peters, or by comparing the diagnosis as published in the *Flora of Tropical Africa*. *Coffea Engleri* differs from it by the mode of vegetation, being an erect tree of about 9 ft., whereas *T. jasminiflora* represents a shrub only 5 ft. high, and, not rarely, of climbing habit. Further, the bark is rough and dark brown in *C. Engleri*; rather smooth and pale brownish in *T. jasminiflora*. Other differences are to be found in the shape, consistency, and indument of the leaves.

More important still are the floral differences. The calyx of *C. Engleri* is much shorter than that of *T. jasminiflora*, also quite entire, not split to the base at two opposite lines; the corolla-lobes of *C. Engleri* are somewhat broader and much more obtuse than in *T. jasminiflora*, where the light emargination of the apex is wanting; the filaments of my species are very short, hardly perceptible, the anthers oblong and obtusate at both ends, whereas the filaments of

T. jasminiflora are longer and protruding beyond the tube, and the anthers narrow, very much acuminate; finally, the styles and the stigmas do not agree in shape. From the differences mentioned it appears, then, that the identity of *C. Engleri* and *T. jasminiflora* is impossible. Mr. Spencer Moore will be able to satisfy himself when comparing the figure of *C. Engleri*—which I have since re-examined and found correct in every detail—with the dissections of the floral parts of *T. jasminiflora* as shown in Engler & Prantl (Natürl. Pflanzenfam. iv. 4, p. 81, fig. 29, F–H). I must object also to his view that no species of *Coffea* would likely occur in those parts of Africa; at any rate, I know several species of *Coffea* from the district of Mosambique, which the Matopos are generally attached to (*cf.* Fl. Trop. Afr.), viz. *C. racemosa* Lour., *zanzebariæ* Lour., and *C. ibo* Fröhner.

Another note of Mr. Spencer Moore refers to a specimen of *Oldenlandia* collected in British East Africa by Kässner as n. 653 or 655,* and described by me as *Oldenlandia Kässneri*. Having learned since that the name *O. Kässneri* has been used for another plant, I now propose to call my former *O. Kässneri O. leptophylla*. At the same time *O. leptophylla* cannot possibly be identical with *O. Wiedenmannii* K. Sch. (not "*Wiedemannii*" as printed). *O. Wiedenmannii*, which Mr. Spencer Moore knew only *ex descriptione*, is a species established by Schumann, who also recognized *O. leptophylla* as a new species, and had given it a special name. It seems very difficult to believe that the same author should have published again as a new species a plant formerly named and described by himself. In fact, *O. Wiedenmannii* and *O. leptophylla* are species essentially different: chiefly by the upper parts of the stem, the calyx and ovary being rather densely hairy in *O. Wiedenmannii*, completely glabrous in *O. leptophylla*; also by the shape of the petals, different in the two species: oblong and distinctly acuminate in *O. Wiedenmannii*; broader, more ovate and rather obtusate at the apex in *O. leptophylla*. I think there is no doubt left about the diversity of the two species.

A third note of Mr. Spencer Moore about *Pentanisia crassifolia*, described by me, will perhaps prove to be better founded. I was induced to create this species by its leaves being very thick, nearly fleshy, remarkably different in that respect from all other species of the genus so far described. As Mr. Spencer Moore now declares that his *P. sericocarpa* shows the same quality, unfortunately not mentioned by him in his original description, I think both species identical, although a few small differences in the dimensions of the floral parts seem to remain.

[Dr. Krause is certainly correct in his view that *Coffea Engleri* K. Krause is not the same plant as *Tricalysia jasminiflora* Benth. & Hook. fil. In fact, I now find that the specimens from Rhodesia referred by me to *T. jasminiflora* (Bulawayo, *Rand*, 637; and

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* As for the number so far doubtful, Mr. Spencer Moore declares it to be 653, whereas the specimen of the Berlin Museum is distinctly 655. He is right, then, in supposing that there is an error, but it is not with me.

Matopo Hills, *Miss Gibbs*, 67) do not belong to that species, but to *T. pachystigma* K. Schum. The error arose from specimens of the two species being mixed up together in the Kew Herbarium, and my inadvertence, due partly to the special appropriateness of the trivial to the Rhodesian plant, in naming my specimens as I did. In my recent note, then, I was really comparing *C. Engleri* with *T. pachystigma*, and I confess myself still unable to see any distinction between them except in two points. One of these relates to the calyx, which, as Dr. Krause tells us, is entire in the case of *C. Engleri*, whereas in *T. pachystigma*, as in *T. jasminiflora*, expansion of the bud causes the calyx to split down on either side, although in early states of flowering the calyx is entire. As regards the second point, namely, the ovules, I would remark that close to the top of each ovary-cell of *T. pachystigma* is attached a large fleshy placenta upon which, near its middle, are inserted two small collateral ovules, the placenta projecting beyond them in the form of a tongue. In each of the ovarian cells of *C. Engleri* Dr. Krause finds one ovule "attached to the common septem," which is just what one would conclude is the case in *T. pachystigma*, unless one discovered the two small ovular knobs projecting from the placenta. Of course I am not in a position to say that Dr. Krause has overlooked these ovules; but seeing that we have to do with two plants growing in the same locality, a locality carefully explored by museum correspondents, the two, calyx apart, indistinguishable except when their ovaries are dissected; seeing, too, that one of these plants is said to belong to a genus hitherto unknown from that part of Africa, and that, as the oversights of skilled botanists have shown, it is often an easy matter to mistake a mass of closely pressed ovules or a number of ovules more or less immersed in a prominent placenta for a single ovule, it is a matter for regret that, as Dr. Krause admits, his material should be in a somewhat immature condition. I would remark further that *T. pachystigma* has a double calyculus unsplit during flowering; it is to be presumed that what Dr. Krause regards as a calyx is not the uppermost of these whorls, the calyx having been already shed.

Before dismissing the matter, one would like to know whether *T. pachystigma* is in the collection made at Bulawayo by Professor Engler. If it be, and dissection reveals its difference from *C. Engleri*, then I must concede the point at issue, and conclude that we have to do with a remarkable case of homoplastic resemblance. If it be not, I venture to think there is only one inference to be drawn from its absence.

As regards the plant I supposed to be *Oldenlandia Wiedenmannii* K. Schum., although naturalists of repute have been known to give two names to identical species, I naturally saw the difficulty Dr. Krause mentions, and not that only, but a further one, seeing that *O. Wiedenmannii* was mentioned in Dr. Krause's memoir, where it is compared with another new species. *Ex descriptione* identifications must always be to some extent unsatisfactory; and I am much obliged to Dr. Krause for so promptly responding to my enquiry about the proper naming of Kässner, 653. The name, it

should be added, was purposely written *Wiedemannii*, although printed *Wiedenmannii*, because the collector's name was said to be Wiedemann, and I therefore concluded *Wiedenmannii* to be a printer's error.—Spencer Moore.]

BRITISH ROSES OF THE *MOLLIS-TOMENTOSA* GROUP.

By the Rev. Augustin Ley, M.A.

Much admirable work was done in this section of the genus by the great British botanists of the beginning of the nineteenth century—Sir James E. Smith and his contemporaries, Joseph Woods and John Lindley. Since their time the chief advance in this section has been made by the great Continental students of the genus, notably Déséglise and Crépin. The critical work of these Continentalists has been studied and partly reproduced in England in this Journal and elsewhere. Déséglise, Crépin, and Christ have given continual help to British workers in the study of our forms, and much good field work has been done in Britain. Its results were admirably systematized by Mr. J. G. Baker in his Monograph of the British Roses published in Journ. Linn. Soc. xi. 197–243 (1869). A revolution was effected by this publication in the intelligibility of many groups of the genus, notably the *Caninæ*; but no great advance was attempted by Mr. Baker on his great English predecessors in the *Tomentosæ*.

A few words may be in place here on the work of Woods, Lindley, and Sir James Smith in this group.

Woods, in his *Synopsis of the British Species of Rosa* (1816), divides the group into five species—*villosa*, *scabriuscula*, *heterophylla*, *pulchella*, and *tomentosa*. Of these, *villosa* = *mollis* Sm. Eng. Flor.; *heterophylla* is stated by Smith to have reverted under cultivation to *mollis*; *pulchella* was founded on a single bush, and proved to be dwarf *mollis*. Woods relies on the narrower leaflets, smaller, less globose fruit, and entire petals to separate *tomentosa* from *villosa*; and on the pinnate sepals to separate *scabriuscula* from *tomentosa*. He distinguishes (by letters) fifteen varieties of *R. tomentosa*; four of these have also names—*hybrida*, *sylvestris*, *canescens*, and *incana*. Var. γ. is undoubtedly the *subcristata* of Baker's Monograph; *incana* is also now placed among the *Caninæ*; ε. is certainly *R. Sherardi* Davies; ε. *sylvestris* is the plant we still recognize under this name; the remainder of Woods' varieties are hardly assignable with any certainty.

Lindley, in his *Rosarum Monographia* (1820), enumerates two species which appear to belong to this group—*villosa* and *tomentosa*. Upon examination, however, it is found that under the former name he is describing *R. gracilis* Woods, a plant belonging to another section. *R. tomentosa* he divides by three letters:—

α. *vera*: "surculis arcuatis, sepalis compositis" = *tomentosa* Sm.

β. *mollis*: "surculis strictissimis, sepalis sub-simplicibus."
γ. *resinosa*: "pumila, cæsia, foliis angustis, floribus ruberrimis."

R. scabriuscula is placed as a variety under (α.). *R. fœtida* Bat. [*sic*] is noticed as a "weak variety with leaves smooth above." On β. *mollis* there is nothing needing comment. Of γ. *resinosa*, which is quoted only from the South of Ireland, the following description is taken from the original specimen in Lindley's herbarium (Camb. Bot. Mus.), marked in Lindley's own writing, "β. [*sic*] *resinosa* Mon.":—Stem slender, dark-coloured, flexuose; thorns long, slender, straight; leaflets 3–5, small, narrow oval to narrow oblong from a cuneate base, hairy on both sides, the under surface very hairy, eglandular, with prominent veins; petiole glandular, not aciculate. Flowers mostly single, small, petals deep rose; peduncle slender, aciculate; calyx-tube small, narrowly ovate-ellipsoid, slightly aciculate. Sepals lanceolate, nearly simple, elongate-appendiculate, densely glandular-aciculate. Plant too young to admit of ascertaining direction or persistence of sepals.

It will be seen that Lindley's own description, quoted above, is excellent for this specimen so far as it goes.

The presumption arising from the single specimen before me is that we have here to deal with a plant deserving the attention of British botanists, abundantly distinct from *R. villosa* δ. *suberecta* Woods, with which it has been identified by Déséglise (see Journ. Bot. 1867, 45), and meriting specific rank should it be rediscovered in Ireland or elsewhere. The name given by Lindley being forestalled by *R. resinosa* Lejeune (Fl. Spa. p. 96 (1811)) is not available; under these circumstances I would propose the name **R. oblita** as appropriate.

In the arrangement and in the Key this plant would probably fall under the Molles, and would have its natural position next after *R. sub-mollis*.

Smith (Eng. Flor. ii. 381 (1824)) divides the group into 1. *R. villosa* = *mollis* Sm. Eng. Bot. with the characters, "Fruit globose, somewhat depressed, partly bristly; calyx slightly compound; leaflets rounded, bluntish, all over downy; prickles nearly straight." 2. *R. tomentosa*: "Fruit elliptic; calyx copiously pinnate; leaves ovate acute, ± downy, both surfaces usually hoary, the under ± glandular." 3. *R. subglobosa*: "Fruit globose; flowers in clusters, 1–9; leaves rather broad, softly downy."

He admits under 2 only a single variety, *scabriuscula*, giving as characters the greener, more harsh leaves, nearly smooth except on the veins of the under surface.

No use is made by Smith of the direction, duration, or curvature of the sepals, nor of the gland-variation of the leaves, in classification, since these points would have introduced an amount of subdivision no doubt inadvisable at Smith's date. In accordance with this, the sheet in Smith's herbarium marked "*R. tomentosa* Flor. Brit." consists of *four* plants: (1) with oval eglandular leaves, hairy below, curved thorns, and apparently reflexed sepals (type *tomentosa*); (2) with greener glandular leaves (probably *scabri-*

uscula); (3) a scrap which may be *R. omissa* Déség.; (4) another scrap which is quite doubtful. These points, however, have all been taken up by later continental students, and would appear to offer the best available means of a more elaborate classification.

In the following paper the classification of the members of the group has been based (1) on the direction, persistence, and curvature of the fruiting sepals; (2) on the curvature of the mature thorns; and (3) on the clothing of the leaves in respect of glands. The differences implied in (1) and (2) appear to be structural, and to afford reliable grounds of specific distinctions. It is doubtful how far this is the case with (3); but differences of gland development imply, in the opinion of the writer, something more fundamental than mere changes of soil, exposure, &c. While therefore it has not been thought allowable to unite in a single variety glandular and eglandular forms, they can permissibly be grouped together as varieties under a single species.

Moreover, the leaf-glands are so easily observed at all stages of the plant, that a systematist would not willingly abandon their help. No notice has been taken of the shape or curvature of the stipules, to which Crépin draws attention; these being points which need much study from the living bushes, and on the diagnostic value of which there is great difference of opinion. In this paper the shape of the leaflets is taken exclusively from the terminal one.

A few words may be allowed upon the selection and preparation of specimens. No rose specimen can be considered satisfactory, especially in this group, which does not exhibit the larger thorns of the mature branches, the shape of which is of much importance in the discrimination of the forms; also the fruit in a stage at least approaching to ripeness, so that the character of the fruiting sepals can be determined. Flowering-sprays and pieces from the vigorous shoots of the year are also desirable, but are not of primary importance; the shape of the thorns especially should not be judged of entirely from those of the first-year shoot. The character and prominence of the disk as well as colour of the petals should be the subject of a written note made at the time of gathering; and the leaves of all specimens should be so dried as to exhibit both the upper and under surface at once on the same piece.

It has been thought more in accordance with nature to treat the whole number of forms here dealt with as a single group, the members of which, exclusive of varieties, may legitimately be assumed to be of equal value and termed *species*; moreover, most of them were originally described as species. The arrangement into *two* species, *mollis* and *tomentosa*, the latter with numerous varieties, melts away when the group is studied; although, as divisional names, these still remain advantageous.

The thanks of the writer are due to many botanical friends who have placed their collections at his disposal for study; to Mr. James Britten for many valuable critical hints, and to Mr. E. G. Baker for assistance without which this paper could not have been undertaken.

KEY.

1 { Fruiting sepals lanceolate, convex at back ± erect and persistent until the ripening of the fruit .....Molles 2
Fruiting sepals ovate or ovate-lanceolate, flat or only slightly convex at back, caducous before the ripening of the fruit....Tomentosi 13

2 { Mature thorns long, narrow, straight or nearly so 3
Mature thorns falcate or uncinate 9

3 { Fruiting sepals truly erect, persistent until the decay of the fruit disk 0; fruit orbicular (*villosa* L.) 4
Fruiting sepals suberect, subpersistent, but falling before the decay of the fruit; disk inconspicuous 6

4 { Subfoliar glands 0*.....(2) *mollis*
Subfoliar glands present 5

5 { Fruit very large, purple-violet when ripe, subfoliar glands very few... (1) *pomifera*
Fruit moderately large, red when ripe, subfoliar glands many ..... (2 var.) *recondita*
Fruit smaller, red when ripe, glabrous .....(2 var.) *cærulea*

6 { Subfoliar glands 0.....(3) *submollis*
Subfoliar glands present..... 7

7 { Bracts very large, hiding the short peduncles, fruit orbicular ..... (4) *omissa*
Bracts moderate, not hiding the peduncles..... 8

8 { Leaflets medium sized, ovate, fruit ovoid .....(4 var.) *resinosoides*
Leaflets medium sized, peduncles and fruit densely aciculate, petiole with uncinate acicles, bracts reddish .....(6) *suberecta*
Leaflets small oblong, fruit small roundish .....(5) *pseudorubiginosa*

9 { Mature thorns falcate 10
Mature thorns uncinate 12

10 { Subfoliar glands 0 11
Subfoliar glands present, main thorns very large..... (9) *Andrzeiovii* (*suberecta*)

11 { Fruit (at least the primordial) pyroid .....(7) *pseudomollis*
Fruits all globose .....(8) *Sherardi*

12 { Fruit (at least the primordial) pyroid .....(10) *uncinata*
Fruits all ellipsoid..... (11) *Woodsiana*

13 { Leaflets simply serrate .....(16) *cinerascens*
Leaflets doubly serrate 14

14 { Styles glabrous.....(17 var.) *fœtida*
Styles hairy or setose 15

15 { Thorns uncinate.....(18) *obovata*
Thorns falcate 16

16 { Leaflets ± hoary and hairy beneath 17
Leaflets greener beneath with few hairs 20

17 { Subfoliar glands 0 18
Subfoliar glands present.....19

18 { Sepals reflexed from the first, peduncle moderately long aciculate ... (14) *tomentosa*
Sepals spreading after flowering, peduncle naked, short, leaflets very soft .....(15) *farinosa*

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* Disregard the midrib, which in nearly every case bears a few glands.

19 { Leaflets moderate, thorns falcate .....(17) *cuspidatoides*
Leaflets large, thorns large, almost uncinate..... (17 var.) *britannica*

20 { Leaflets large oblong, subfoliar glands few, fruit oblong ..... (12) *scabriuscula*
Leaflets moderate ovate, subfoliar glands many, fruit round ..... (13) *sylvestris*

1. R. POMIFERA J. Herrm. Dissert. Rosa, 16 (1762). Habit very robust; thorns slender, straight; leaflets 5–7, large, the terminal one 1½–2 inches, elliptic-oblong, rounded or subcordate at base, hairy on both sides, the serration open; subfoliar glands often very few; "stipules glabrous above"; fruit globular or subglobular, usually densely aciculate; petals ciliate, glandular at base. The leaflets are stated by Déséglise to be eglandular below; subfoliar glands, however, are present on most of Déséglise's own specimens; and though very variable in number are never, I believe, wholly absent.

The "apple-rose" is well known as a cultivated plant; but its occurrence here and there in hedges in Britain has hitherto been thought insufficient to give it a place as a native plant. The writer has, however, a specimen gathered by himself on mountain rocks in Breconshire in 1876 in a situation in which it could hardly have been introduced. Tidenham Chase, West Gloucester, in two spots, *Shoolbred*! Stafford; Yorks; Roxburgh!

2. R. MOLLIS Sm. Eng. Bot. t. 2459 (1812). *R. mollissima* Fr. Novit. ed. 2, 51 (1828). Bush robust, with straight stiff branches; leaflets broadly oval elliptic, softly hairy; peduncles short, often curved; fruit rather large, globose, ripening early; flowers almost blood-red on opening.

Abundant in the north, thinning out rapidly southwards in Britain, but extending in the central counties to Stafford and Derby, and in the west to Radnor! Hereford! Brecon! and Monmouth!

Records of *R. mollis* from counties south of Monmouth should be subjected to a strict examination before being accepted; in all cases which have come under the notice of the writer such records have uniformly proved to belong to one or other of the cognate species.

Var. *recondita* (Puget) in Déség. Revis. 46; Aschers. & Graebn. Syn. Mittel-eur. Fl. vi. 66 (as *R. pomifera* Herrm. a. 1). Leaflets with numerous subfoliar glands; fruit usually larger than in type *mollis*, red when ripe, aciculate or naked; petals not ciliate.

Too near to *R. mollis* Sm., and especially to its var. *cærulea* Woods, to be dissociated from it. Continental authors unite it to *R. pomifera* Herrm.

North of England and Scotland. North Stafford! West Lancs! West and North-west Yorks; Northumberland! Renfrew! Roxburgh! Edinburgh! Fife! Mid Perth! South Aberdeen! Elgin! West Inverness! Lanark! West Sutherland!

Var. *cærulea*. *R. villosa* var. *cærulea* Woods in Trans. Linn. Soc. xii. 193 (1817). *R. mollissima* var. *cærulea* Déségl. Revis. sect. Toment. 38 (1866). *R. mollis* var. *cærulea* Baker ex Déségl. in

Bull. Soc. Bot. Belg. xv. 578 (1876). Differs from the type in the leaflets having subfoliar glands varying in quantity but seldom numerous; in the peduncle and fruit being glabrous; in the young branches being often glaucous; and in the fruit being smaller.

Distribution as in the type; extending southward to Montgomery! Radnor! Brecon! Carmarthen! and Cardigan!

3. **R. submollis.** Bush less robust than in the preceding, with strong arching surculi. Very near *R. mollis*, with the thorns equally narrow based but rather shorter and rather more curved; the leaflets broadly elliptic, hairy beneath; the peduncle long or short, always straight; the sepals suberect in fruit and persistent until the fruit has changed colour, but finally caducous; the fruit large ovoid, the primordial pyroid, ripening later.

Distribution general? Somerset! Surrey! Herts! Bucks! Hunts! W. Gloucester! Hereford! Worcester! Stafford! Salop! Glamorgan! Brecon! Radnor! Montgomery! Merioneth! Carnarvon! S. Lincoln! Derby! West Lancs! N. E. Yorks! Durham! Northumberland! Westmoreland! Cumberland! Dumfries! Kirkcudbright! Wigton! Renfrew! Selkirk! Fife! West and Mid Perth! Elgin! East and West Inverness! Skye! West Sutherland! Down!, Ireland.

4. R. OMISSA Déségl. in Billotia, p. 47 (1864). Habit tufted, with close-set flexuose branches; thorns long, straight, compressed; leaflets oval-elliptic, with numerous subfoliar glands; *peduncles very short, entirely hidden* by the *large* bracts; fruit obovoid pyroid glabrous; sepals suberect persistent until maturity of the fruit, then caducous; petals bright rose.

Rare in Britain. Stafford! Salop! Montgomery! Denbigh! Flint! Derby! Cheshire! Cumberland! Kirkcudbright! Renfrew! Fife! Stirling! Mid Perth! Forfar! E. Ross! Taransay in the Hebrides! Antrim!, Ireland.

Var. *resinosoides*. *R. omissa* Déségl. var. *resinosoides* Crépin in Billot. Exsicc. 3601; Bull. Soc. Belg. xxi. 1, 98 (1882). *R. omissa*, A, 1, 2, *resinosoides* R. Keller in Aschers. & Graebn. Syn. vi. 76, 1900. Differs from the type in the thorns being unequal, straight or slightly bent, slenderer and in part acicular on the flower-shoots; in the peduncles being longer, the clusters of flower more numerous, and in the ovate aciculate fruit.

Much more generally distributed in Britain than the type. S. Devon! Isle of Wight! West Kent! Herts! West Gloucester! Monmouth! Hereford! Worcester! Stafford! Radnor! Carnarvon! Derby! Cheshire! N. E. Yorks! Northumberland! Westmoreland! Cumberland! Dumfries! Kirkcudbright! Wigton! Roxburgh! Fife! West, Mid, and East Perth! Forfar! East and West Inverness! Argyle! E. Ross! Antrim!, Down!, East Mayo!, Galway!, Ireland.

5. R. PSEUDORUBIGINOSA Lejeune, Fl. Spa. i. 229 (1811). *R. Arduennensis* Crépin in Bull. Ac. Belg. 2, Sér. xiv. 101 (1862). Thorns long, narrow, straight; leaflets small, oval to oval-oblong, hairy on both sides; subfoliar glands numerous, the upper surface

also often glandular; sepals suberect, subpersistent; fruit roundly oval aciculate.

Rare, but widely scattered in Britain. West Kent! Surrey! West Lancs! Yorks! Dumfries! Mid Perth!

6. **R. suberecta.** *R. villosa δ. suberecta* Woods in Trans. Linn. Soc. xii. 192 (1818); *ex descript.* Thorns straight, sometimes robust ± falcate; leaflets oval-elliptic, ± hairy on both sides; subfoliar glands few or many; petioles very glandular, *with many unequal, falcate acicles and pricklets*; clusters of 1–5 flowers; peduncles moderate, these and the ovoid calyx-tube densely and longly glandular-aciculate; fruit globose; sepals considerably pinnate, appendiculate, densely glandular-aciculate, suberect and subpersistent. Petals rose; sometimes "white with purplish spot" (Marshall). Young stems, petioles, thorns, stipules, and bracts *vinous red.*

The above description, taken from recent British specimens, agrees so well with Woods' original description which is here subjoined, as to leave no doubt as to the identity of the plants:—

"Fruit globose, that and the petiole furnished with strong setæ; flowers deep red. Stem stiff and upright; leaflets 7 sometimes 9, elliptic concave; stems, petioles, young prickles, and mid-rib of a vinous red. The general appearance of this variety is such as to make me wish to consider it a distinct species."

R. suberecta Woods varies greatly in the shape and direction of the thorns and in the clothing of the leaflets; the flowers also are sometimes white. It is, notwithstanding, an easily recognized species; the vinous colour of its younger parts seems never to be wholly absent, even in the albino variety. Endemic?

Widely spread in the North of England and Scotland, and occurring in Ireland. Carnarvon! Derby! West Lancs! N. E. Yorks! Northumberland! Westmoreland! Cumberland! Wigton! Renfrew! Roxburgh! Berwick! Clackmannan! E. Perth! S. Aberdeen! Elgin! East and West Inverness! Argyle! Skye! East and West Ross! W. Sutherland! Ireland: Antrim! Londonderry!

Var. *glabrata.* *R. mollissima* Willd. var. *glabrata* Fr. Nov. Flor. Suec. ed. 2, 151 (1828)?; non *R. glabrata* Kit. in Linnæa, xxxii. 588 (1863). Report Bot. Exch. Club, 1887, 178; 1888, 213. Journ. Bot. 1895, 344. Leaves glabrous on both surfaces; subfoliar glands few; petiole, sepals, and fruit as in type.

Fries's original description of his plant runs as follows:— "Foliis utrinque glaberrimis subtus glanduloso-punctatis. In maritimis Blekingiæ. Hanc primo obtutu *R. caninam* crederes, sed aculei recti teretes, foliorum serraturæ et glandulæ, petala denticulata, fructus molles precoces hispidi omnino ut in vulgari."

Scotland: very local? East Inverness! West Inverness! East Ross!

7. **R. pseudomollis.** *R. tomentosa* Sm. var. *pseudomollis* E. G. Baker in Journ. Bot. 1892, 341. Bush as in *R. submollis*; main thorns curved, falcate; leaflets broadly ovate-elliptic, densely and softly hairy, subfoliar glands 0 except on mid-rib; calyx-tube

naked; sepals nearly simple, suberect, subpersistent; clusters of 2–4 flowers; fruit roundish, the primordial always pyroid, large, late in ripening. Generally well-marked and easily recognized.

Widely distributed, and in some districts abundant. Herts! Berks! Monmouth! Hereford! Worcester! Stafford! Salop! Brecon! Radnor! Carmarthen! Cardigan! Denbigh! Leicester! Cheshire! Yorks! Northumberland! Cumberland! West Inverness! Argyle! Skye! Ham Common, Surrey, *Herb. Mus. Brit.* 1818!

8. R. Sherardi Davies, Welsh Botanology, 49 (1813), et in Herb. Mus. Brit.! *R. subglobosa* Sm. Eng. Fl. ii. 384 (1824). *R. tomentosa* Sm. var. *subglobosa* Carion, Cat. Saône et Loire, 43 (1859). Habit and thorns of *R. pseudomollis*; leaflets densely and softly hairy, normally narrower than in that species, subfoliar glands 0 except on mid-rib; calyx-tube usually aciculate; sepals normally suberect, subpersistent, but somewhat uncertain in direction and persistence; fruit, even the primordial, orbicular, large or small; flowers 3–9 in a cluster.

Distribution general in England. South Hants! West Kent! Surrey! Herts! Berks! Cambs! Hereford! Warwick! Brecon! Carnarvon! Flint! Anglesea! Yorks! North Lancs! Cumberland!

9. R. Andrzeiovii Steven ex Besser, Enum. Pl. Volhyniæ, 19 (1822). "A tufted branching shrub"; thorns falcate, normally very large; leaflets broadly elliptic, truncate or emarginate at base, often overlapping, hairy on both surfaces "villosity glossy"; subfoliar glands varying in amount, normally many; calyx-tube normally hispid-glandular, ovoid; sepals assurgent, subpersistent, subpinnate appendiculate; fruit globose; clusters many-flowered (3–9). The spelling of this name has varied greatly, but the above is the original.

Distribution wide. S. Devon! N. Devon! S. Somerset! Surrey! Herts! Worcester! Glamorgan! Brecon! Radnor! Cardigan! Carnarvon! Anglesea! Cheshire! N. E. Yorks! Cumberland! Perth! S. Aberdeen! Elgin! East and West Inverness! Galway!, Ireland.

Plants occur in Britain with thorns of medium size and leaflets narrower than as above described, which are probably to be referred to this species.

10. **R. uncinata.** *R. tomentosa* Sm. var. *uncinata* F. A. Lees in Bot. Record Club Rep. 1884–1886, 123 (1887). Bush arching; thorns all similar, strong, uncinate; leaflets oval-oblong, hairy on both surfaces; subfoliar glands varying in number, sometimes very few, usually numerous; calyx-tube glandular-aciculate; sepals nearly simple, suberect, subpersistent; petals full rose; fruit ovoid-subrotund, ripening in August or September; clusters of 2–4 flowers. Always very constant in its characters, and easily recognizable.

Distribution general. West Kent! Surrey! Berks! Oxon! Hereford! Worcester! Stafford! Brecon! Radnor! Carnarvon! Denbigh! Derby! Cheshire! N. E. Yorks! East Inverness! Argyle! E. Ross! W. Sutherland! A perfectly glabrous form in N. E. Yorks, *Groves*!

11. **R. Woodsiana.** *R. tomentosa* Sm. var. *Woodsiana* Groves in Bot. Exchange Club Rep. 1880, 30 (1881). Bush erect, compact; main thorns uncinate; leaves oval, slightly hairy on both surfaces, serration open, subfoliar glands few; peduncles densely glandular-aciculate; petals pale rose; fruit ellipsoid, ripening in September. Very near *R. uncinata*, to which it might perhaps be united as a variety.

Wimbledon Common, Surrey, *Groves*.

12. R. SCABRIUSCULA Sm. Eng. Bot. t. 1896 (1808). *R. tomentosa* Sm. var. *scabriuscula* Baker in Trans. Linn. Soc. xi. 217 (1869). Bush tall, arching; thorns long, narrow, slightly falcate; leaflets long-ovate-elliptic or elliptic-obovate, deeply, sharply, doubly serrate, green on both surfaces, slightly hairy, subfoliar glands few; peduncles long, glandular-aciculate; calyx-tube aciculate or naked; sepals subpinnate, long-appendiculate; uncertain in direction, slightly ascending after flowering or reflexed from the first, always deciduous before the fruit changes colour; petals light rose; clusters often 6 or more flowered; fruit ovoid, sometimes prolonged, ripening in October.

Abundant and of general distribution in England, Scotland, and Ireland; more common southwards. Sutherland, Bettyhill, *Shoolbred*! Cornwall, Sheviock, *Briggs*! Wicklow, *Baker*! Kerry (Muckross)! A glabrous form of this rose occurs: Carnarvon, *Linton*! West Yorks, Dent Dale.

Another specialized form of this plant occurs at the Menai Straits, Carnarvon, very robust, with glandular aciculate petioles, large often simply serrate glabrescent leaflets, and partly sub-persistent and suberect sepals. This plant has been attributed to *R. britannica* Déség., from which however it is very different. It probably owes its peculiarities to its robustness, joined with its maritime situation.

13. R. SYLVESTRIS Lindl. Syn. Brit. Fl. 101 (1829). *R. tomentosa* Sm. var. *sylvestris* Woods in Trans. Linn. Soc. xii. 202 (1817). Habit less tall than in *R. scabriuscula*; thorns stouter, falcate; leaves oval-elliptic, slightly hairy, green on both surfaces, subfoliar glands numerous; peduncles and clusters of flower as in *R. scabriuscula*; sepals subpinnate, shortly appendiculate, reflexed from the first, caducous; fruit ovoid or urceolate, ripening in October.

Distribution as *R. scabriuscula*, but less abundant. S. Devon! Kent! Cheshire! Roxburgh! East Inverness! Mayo!, Ireland.

14. R. TOMENTOSA Sm. Fl. Brit. ii. 539 (1800) (*ex parte*). Bush arching, flexuose; main thorns long, falcate, becoming smaller and straighter on the flowering-shoots; leaves normally softly hairy on both surfaces; subfoliar glands 0; peduncles long, glandular aciculate; flowers up to 6 or more in a cluster; sepals ovate flattish, the main ones often strongly pinnate; reflexed from the first, and falling before the fruit changes colour; fruit small, normally ovate, at times subrotund or shortly urceolate, ripening in October.

As defined above, an easily recognizable and tolerably constant rose.

Distribution general; probably the most abundant species of the group, at least in Middle and South England. Glabrescent, or even entirely glabrous, forms are occasionally met with.

15. R. FARINOSA Rau, Enum. Rosarum circa Wirceburgum, 147 (1816); non Bechst. *R. tomentosa* Sm. var. *farinosa* Séringe in DC. Prod. ii. 618 (1825). Habit of *R. tomentosa*; stem and leaves glaucous; thorns long, slightly falcate, few; leaflets densely grey-downy with very open double serration; petioles whitish-downy; peduncles short, these and the calyx-tube naked; sepals with long narrow point, slightly pinnate, spreading after flowering, caducous; fruit *obovoid, ripening in* October.

Rare and seldom quite typical in Britain. Perth, Hailstone! Stafford! Derby! Salop! Hereford! Carmarthen! Co. Down!, Ireland.

16. R. CINERASCENS Dumort. Flora Belg. 93 (1897). *R. tomentosa* Sm. var. *cinerascens* Crép. Bull. Ac. Belg. Sér. 2, xiv. 106 (1862). Habit of *R. tomentosa*; thorns falcate, the main ones short; leaves oval-elliptic, densely grey-downy and soft, simply openly serrate; sepals as in *R. farinosa*; peduncles glandular-aciculate; calyx-tube naked; flower-clusters 1–3; fruit shortly elliptic or subglobose, ripening in October.

Rare. Perth, *Barclay*! East Ross, *Herb. Bailey*! Stafford, Alstonfield and Archford Moor, *Purchas*! Derby, near Ashbourne, *Purchas*! Brecon, Craig Cille, *Riddelsdell*! Radnor, Elan Valley!

All the British examples I have seen differ slightly from the foreign type in having leaves less densely grey-downy and soft.

17. R. CUSPIDATOIDES Crépin in Scheutz. Studier d. skand. Rosa, 37 (1872). Bush arching; main thorns falcate; leaflets oval, hairy on both sides, subfoliar glands usually numerous; peduncle and calyx-tube glandular-aciculate; sepals nearly simple, shortly appendiculate, reflexed or spreading, caducous; fruit ovoid or subrotund, ripening in October.

Distribution general; rather common in England. Cornwall! S. Devon! South Hants! West Kent! Surrey! West Gloucester! Hereford! Worcester! Warwick! Stafford! Salop! Carnarvon! Cheshire! Mid-west Yorks! Northumberland! Elgin!

Var. *britannica*. *R. britannica* Déségl. ex Baker in Journ. Linn. Soc. xi. 218 (1869). *R. Jundzilliana* Baker (non Besser) in Naturalist, i. 65 (1864). Differs from the type in the thorns being very robust, almost uncinate; in the leaflets being large, very hairy; and in the clusters being of very numerous flowers.

Rare. Cheshire, *Webb*! Hereford! Worcester! Flint!

Var. *fœtida*. *R. fœtida* Bast. Flor. Maine et Loire, Suppl. 29 (1812). Differs from the type in having glabrous styles, and in the fruit being ovoid.

Widely distributed and rather common in England? "besonders in Gros-brittannien verbreitet," Keller in Aschers. & Graebn. Syn. S. Devon! North Somerset! West Kent! Surrey! Hereford! Worcester! Radnor! Carnarvon! Yorks!

18. **R. obovata.** *R. tomentosa* Sm. var. *obovata* Baker, Mon.

Trans. Linn. Soc. xi. 218 (1869). Bush low; thorns all uncinate; leaflets small, obovate-oblong from a deltoid base; upper surface naked, under hairy and glandular*; peduncles short, naked, hidden by the bracts; calyx-tube naked; sepals very slightly glandular, nearly simple, reflexed, caducous; fruit small, oblong or subglobose; flowers mostly single.

Rare. Yorks, Thirsk, *Baker*; Durham, Egglestone, *Baker*; Edinburgh, near Hawthornden, *Webb*! S. Aberdeen!

SHORT NOTES.

Glyceria Foucaudii Hackel in Hampshire.—I have come across a sheet, labelled "*Glyceria maritima* Wahl. Saltmarsh near Mudeford, S. Hants. 15, vi. 1893," and collected by Rev. E. F. Linton, who added the remark:—"Large, but I suppose ordinary?" It agrees, I consider, very well with specimens of my No. 867, from a muddy ditch on the coast near Grain, West Kent, June 21st, 1892, on which Professor Hackel wrote to Mr. Arthur Bennett in 1893 as follows:—"*Glyceria Foucaudii*, Hackel *in litt. ad* Foucaud (n. sp.). —This is a very distinct species of *Glyceria*, discovered last year by Foucaud in the Department of Charente-Inférieure. Foucaud himself will soon publish a description of it. It seems to be one of the Atlantic plants which reach southern England. You may distinguish it from all the congeners (it comes nearest *G. maritima*) by the silky pubescence of the nerves of the flowering glumes, and by the *ciliated* upper palea, &c." I understood that Hackel had altered his opinion as to its specific rank, and it was accordingly mentioned in the *Flora of Kent* (p. 405) only as a remarkably luxuriant form of *G. maritima*. But in September, 1904, he named an identical grass, found that summer by Miss M. C. Knowles on Auginish Island, Foynes, Co. Limerick, as "typical *Atropis Foucaudii* Hack. in Husnot, *Gramina*, p. 49 (1896)." It certainly *looks* like a good species, when well developed.—Edward S. Marshall.

British Rubi.—As is well known to my friend Dr. Gilbert,—and as indeed he has plainly shown in his "Notes on British Rubi" in the April number of this Journal,—there is the widest disagreement between him and me on this subject. But the disagreement is *so* wide, and, in a sense, so fundamental, that I cannot think any useful purpose would be served by a detailed discussion of his views in the pages of the Journal. If such views as to variability of form and frequency of crossing between allied forms are accepted, all serious study of the genus might well be given up as hopeless and unprofitable; but most of us who have given time and patient work to the study are not in the slightest degree prepared for such a surrender, and the various vague conjectures and

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* Mr. Baker writes, "not glanduloso-setose"; but all the specimens I have seen from the classical station have a few sessile or subsessile glands on the petiole.

speculations which occupy the greater part of Dr. Gilbert's paper certainly would not help us towards it. For myself I need only say that none of these suggestions commend themselves to me. They seem to me, in fact, not only unproved, but, so far as I can understand them, highly improbable and inconsistent with my knowledge of the plants in question. While far from wishing to imply that I have nothing to learn on such points as are here discussed, I shall not, I hope, be thought presumptuous if I still adhere with unbroken confidence to the line deliberately adopted in my *Handbook* in 1900 and in the papers which I have subsequently contributed to this Journal.—W. Moyle Rogers.

Spanish and Portuguese Carices.—*Carex basilaris* Jord., which Kükenthal puts as a variety of the Portuguese *C. depressa* Link, is not recorded for Spain by Nyman, but it is included by Willkomm & Lange in their Supplement to Prod. Fl. Hisp., on the faith of a specimen collected by Mr. J. Ball near Algeciras in Granada. I gathered it in 1903, on the picturesque range of Tibidabo, which is north of Barcelona, in Catalonia; I also met with it in 1904, near Costobelle, Alpes Maritimes. At Tibidabo it was associated with *C. Linkii* Schkuhr (*C. distachya* Desf.), the latter a new record for Catalonia. *C. chætophylla* Steudel, a subspecies in Nyman's *Conspectus*, is rightly, I think, put as a variety of *C. divisa* Huds. by Kükenthal. Nyman only records it from Barcelona. I saw it abundantly in grassy ground near the Escurial, and in several other parts of Spain. *C. glauca* Scop. var. *leiocarpa* Willk. (Prodr. Fl. Hisp. i. 123—"au spec. distincta?") occurred with *Scilla peruviana* near Algeciras; it appears to be worthy of subspecific rank. It is new to this district, and occurred at much lower elevation than previously recorded. *C. divulsa* Stokes, which is unrecorded by Nyman for Portugal, I gathered at Cintra in 1903.—G. Claridge Druce.

Œcology of Montia fontana L.—While recently engaged in the study and œcology of some of our smaller streams, I was struck with the peculiarities of *Montia fontana* L. in its choice of position along the streams, and the apparent reasons for its choice. In the particular stream which I have selected as an example, *M. fontana* occurred in plenty at the source but was in scanty quantities and poorly developed elsewhere along its course. The reason for this does not seem to be very evident, unless it is caused by the stream having a too rapid fall, and the absence of boggy ground owing to the steep declivities of the banks. At the source, where it grew in large and luxuriant patches, two other reasons for its choice of sites seem to appear. *M. fontana* does not occur anywhere in the stream itself, neither does it occur in *all* the boggy slopes which surround it—in these it is only found where there is some slight flow of water, and not when the water is stagnant. The factors, therefore, which seem to be necessary for the growth of this plant appear to be a spongy bog with a very slight trickle of water. If the flow be too great there is no *Montia*; if the bog be stagnant there is likewise no *Montia*. *Montia*, however, grows at the *side* of the stream where the flow is broken and slight, and also in those bogs

in which water flows. I have observed these peculiarities in many of the streams on the Quantock Hills in Somerset, and it would seem that these two factors are and must be present wherever *Montia fontana* grows.—L. H. Riley.

Hypericum humifusum L. var. Liottardi Vill.—Two specimens in my herbarium, gathered by me at Darenth in Kent and at West Kirby in Cheshire respectively, agree closely with one another, but differ very considerably from the usual form of *H. humifusum*. Mr. Arthur Bennett kindly examined my plants, and wrote:—"The W. Kirby and the Darenth specimens seem to be the var. *Liottardi* Vill. described in Brébisson's *Fl. de la Normandie* (ed. 3, 61) as "Tige naine pauciflore; fleurs a 4 pétales." These plants are so remarkably characteristic that it seems desirable to record the fact of their occurrence in these counties.—E. Drabble.

Schistostega osmundacea.—At a recent meeting of the Liverpool Botanical Society, Mr. W. G. Travis exhibited specimens of *Schistostega osmundacea* which he had discovered growing in fair amount on sandstone rock. It is the more remarkable that it has so long escaped observation in this neighbourhood, seeing that it grows in fair quantity within the city boundary.—A. A. Dallman.

Sisymbrium pannonicum in Cheshire (p. 163).—Dr. Drabble's note reminded me that I observed three plants of this species in 1903, on Hilbre Island at the mouth of the Dee, only a few miles distant from that mentioned. I suppose that in both cases the plant must have spread across the Mersey from the Lancashire station, where it occurs in quantity.—A. A. Dallman.

Potamogeton salignus A. Fryer.—Probably one of the least likely places in which to look for the description of a new species would be among the addenda to the botanical article in a general county history. The Victoria County History of Devonshire (1906), the botany of which we hope to notice when space will allow, contains such a description, which we transcribe in order that it may be brought to the knowledge of botanists, especially foreign ones, who can hardly be expected to hunt through the history of English counties on the chance that a new species may lurk in some corner. The description runs:—"*Potamogeton salignus*, A. Fryer (probably a hybrid), differing from *P. salicifolius* Wolfg. by the outermost vein of the leaves starting near the base of the midrib and not from the base of the margin of the leaves" (i. 129).

NOTICE OF BOOK.

Sukkulente Euphorbien. Von Alwin Berger, 8vo., pp. viii., 135, with 33 figures. Stuttgart: Ulmer, 1906 ("1907"). Price 2.50 marks.

This little volume is the first of a series of illustrated handbooks on succulent plants which M. Berger proposes to issue. It is nearly a hundred years since the publication of Haworth's *Synopsis Plantarum Succulentarum* (1812), and the number of

succulent plants which have become known in cultivation in the meantime is so large as to render advisable a separate treatment for different groups. The other handbooks which M. Berger has in preparation deal respectively with *Aloe* and allied genera, *Agave* and allied genera, *Mesembryanthemum* and *Portulacaceæ*, *Crassulaceæ*, *Cacti*, *Stapelieæ* and *Compositæ*.

The succulent Euphorbias include, in addition to the extreme cactus-like forms, a number of leaf-bearing species which are connected by a series of gradations with the small herbaceous type. They are well-marked xerophytes, found for the most part in Africa, inhabiting the deserts and steppes or dry mountain slopes in South Africa, and extending eastwards and northwards to the Red Sea. On the west they occur in Morocco, the Canary Islands, Cape Verde Islands, and the Azores, while on the east of the great centre species are found in Madagascar, Arabia, Socotra and India. Three species only have been described from America. With few exceptions only those species which are in cultivation are included by M. Berger. They number over a hundred, and are arranged in twelve sections; a description in German accompanies each species, and references are given to the original description and to published figures. Each section or sub-section is preceded by a key. Several new species are described; some of these are known only in cultivation, but one, *E. Stapfii*, is a recent discovery by Mr. Dawe, at Entebbe, in Uganda.

The book contains a number of useful figures, including many photographic reproductions of habit.

A. B. R.

BOOK-NOTES, NEWS, &c.

We have received two packets (6*d.* each) of "The Country Press Pictorial Descriptive Postcards"—one of the boles and one of "natural figures" of British trees, with short descriptions of each by Mr. F. G. Heath. The pictures are well done and would be useful in schools: the letterpress is very brief and not equally commendable—we do not know why the name *Platanus orientalis* is replaced by the later and less familiar *P. acerifolia*, and we doubt whether the Lime was ever "called 'The Carver's Tree.'" But the pictures are worth the money.

An interesting feature of the Royal Agricultural Society's forthcoming show, to be held upon the Racecourse at Lincoln from the 25th to the 29th June next, will be the Forestry Exhibition. For competition special medals will be offered in fourteen different sections, including classes for specimen boards of various sorts of timber, specimens showing the damage done by insect pests, the comparative quality of timber grown on different soils, and the respective ages at which it reaches marketable size, the beneficial effects of pruning when well done, and the injurious effects when badly done. Plots of open ground-space will be allotted to firms of nurserymen for the exhibition of forest trees and shrubs; and

owners of forests and woodlands, and others interested, are invited to send specimens for exhibition. Forms of entry can be obtained on application to the Secretary of the Royal Agricultural Society, 16, Bedford Square, London, W.C.

If any testimony were needed as to the importance to students of Mr. Massee's *Text-book of Plant Diseases* (Duckworth & Co., 6s. net), it would be amply afforded by the call for the third edition, which has just been issued. There is no change in the text of the volume, but after the preface some eight pages have been interpolated, bearing on some new and serious outbreaks of disease. One on potatoes, due, the author says, to *Œdomyces leproides*, lives in the soil and causes rotting of the tubers. Another pest, also due to a fungus, of which we had something to say in our last issue (p. 168), is the famous American Gooseberry Mildew, Mr. Massee recognizes to some extent the serious nature of this disease, but still inclines to the opinion that it is no new thing. He again cites the testimony of "people in this country who state that they have known the disease for the last thirty, or even fifty, years," and their statements, he says, have not been proved to be wrong; he also jeers at the idea that the fungus had been introduced from America to the Continent, or from the Continent to this country. Mycologists on the Continent are of a different opinion; they hold, on what satisfies them as sufficient evidence, that the fungus was brought from America about the year 1900. Mr. Salmon tells us that in the district in Worcestershire where the disease has broken out, bushes had been imported from the Continent, and that these bushes were diseased, while the native-grown were healthy. Again, Mr. Massee says that in this country the disease, as a rule, confines itself to the tips of the branches; but that is certainly not the case in Ireland. From Co. Down it is reported that "the disease is very prevalent this year (1905), some growers having every bush affected, and the fruit rendered quite unsaleable." It is difficult to understand why Mr. Massee should insist on treating so lightly this very serious outbreak of disease; but we can join with him in heartily desiring that it may prove to be of but small importance, and that we may have no fear for the future safety of our gooseberries.

A short but interesting paper has just been published (in the *Ohio Naturalist* for March) by R. F. Griggs on *Cymathere*, a genus of *Laminariaceæ*, which occurs on the north-west coast of America. Its only species, *C. triplicata* J. Ag., grows abundantly at the Minnesota Seaside Station on Vancouver's Island, in sheltered nooks out of reach of the surge, forming in that respect a marked contrast to such genera as *Postelsia* and *Lessoniopsis*. *Cymathere* only succeeds well in situations which are never uncovered by the tide—a fact that adds materially to the difficulty of collecting the young forms. Mature plants may reach a length of four metres and a breadth of twenty-two centimetres, though most plants are smaller than this. The sporangia occur at the base of the lamina on both sides, and they extend much further up the grooves than on the ridges of the plicæ. The stipe is wholly without mucilage

ducts of any kind, but in the lamina there occurs an irregular circle of openings which may be considered mucilage ducts, although they do not possess any lining wall of special secreting cells. Indeed, these openings appear more like a breaking down of certain cells, and may, perhaps, be the beginning of degeneration. The inner cortex is developed into thick-walled strengthening tissue as is usual in the family, and it is of this tissue that the ribs on the folds are composed. In the pith-web the hyphal elements are very short, and the trumpet-hyphæ are very scarce and poorly developed. The holdfast is simple, and the paraphyses are linear and unthickened, which, together with the simplicity of the structure in other ways, would point to a branching off from the main phylum of the *Laminariaceæ* at an early date in their development. The long persistence and large size of the 1-layered primary lamina is a noteworthy feature of *C. triplicata*.—E. S. G.

Mr. F. J. Chittenden has published in the *Essex Naturalist* (xiv. 204–235) a list of *The Mosses of Essex*, with their distribution in the county. About two hundred species and subspecies, exclusive of *Sphagnaceæ*, are enumerated. This total will doubtless be raised when the northern, eastern, and southern (with its chalk) parts of the county have been thoroughly searched; but the low elevation of the surface, the lack of diversity in the soil, the restricted rainfall, and the pernicious influence of London smoke are all factors which tend to diminish the moss-flora of the county. In connection with the poor rainfall the species produce fruit far less abundantly, and are less luxuriant in their vegetative growth than is the case in the moist counties of the west of England. The two chief rarities recorded for the county are *Zygodon Forsteri* and *Grimmia commutata*.

We have received various suggestions concerning the *List of British Seed-Plants*, some of which will be incorporated in a second series of "notes" similar to those published in this Journal for March. Meanwhile Mr. Hanbury is actively engaged in the preparation of a new edition of the *London Catalogue*, and we understand that the Clarendon Press will publish a list drawn up by Mr. Druce, so that the nomenclature of our British species is receiving ample attention.

The Report of the Joint Meeting of Northern Literary and Scientific Societies held at Banff last summer contains what appears to be a full and careful list of the plants of the neighbourhood of Banff. We are glad to learn that its publication has stimulated the Banffshire Field Club to undertake the preparation of a flora of the county. Mr. John Yeats, Secretary of the Club, will be glad to receive any assistance; his address is 27, Castle Street, Banff.

The Report also contains a paper by Mr. William Wilson, of Terpensie, on "The Common Primrose," which is at least as extraordinary as any of those on which we have from time to time had occasion to comment—here is an example:—"Dealing now with our immediate subject, and to show the confusion which exists in standard works, we shall state that under Bentham we have a Family *Primulaceæ*, with a number of genera, of which the second

is *Primula*. In the case of my friend Babington, again, we have the same as an Order which the other has as a Family, with Tribe number two as *Primulaceæ*. The former is Family forty-six, and the latter is Order sixty-one. In the former case, again, we have the whole genus but one classed as one species, which are again divided into three races, as he calls them, of which Primrose *Primula veris* is used, while his other common species are the Mealy Primrose *P. farinosa* (Linnæus), the Common Primrose, the Cowslip, and the Oxlip; but added to the last we have it stated that it is now generally believed that there is really a distinct species *P. elatior* of Jacquin, an Austrian botanist, and occurring in some of the eastern counties of England, but its normal features are declared to be Continental. Then as another species we have the Mealy Primrose, *P. farinosa* (Linn.), permeating all the great mountain ranges of Europe and Asia far into the Arctic regions, also in the Antarctic region of South America. In my opinion simply the formation of the plant under the conditions which it grows, and that is neither saying whether this form has developed from the normal type or that it in itself is the normal or original form from which our present day Primrose has emerged. The whole evidence seems to me to point out the one genus with so many races—that is, if following Bentham's style of classification."

By the death of Sir Thomas Hanbury, which took place at La Mortola, Ventimiglia, on March 9, horticulture has been deprived of one of its most enthusiastic and most generous votaries. The fame of his wonderful garden is worldwide, and his generosity in matters horticultural was shown in 1903 by his purchase and presentation to the Royal Horticultural Society of the late G. F. Wilson's garden at Wisley, in Surrey. He was born at Clapham, June 21, 1832. Though not himself a botanist, Hanbury did much to encourage botanical pursuits; the Istituto Botanico Hanbury in the Botanical Gardens at Genoa, founded by him, commemorates his practical interest in science. A *Florula Mortolensis*, an enumeration of the plants growing wild at La Mortola, published in 1905, was drawn up by his order by Mr. Alwin Berger, the curator of his garden.

The authorized English translation of Dr. Ludwig Jost's *Lectures on Plant Physiology*, by Prof. R. J. Harvey Gibson, of Liverpool, with 172 illustrations, will be issued very shortly by the Clarendon Press. The Press also announces the second volume of Dr. Paul Knuth's *Handbook of Flower Pollination*, translated by Prof. J. R. Ainsworth Davies, of Aberystwith, containing an account of all known observations upon the pollination of the flowers of plants of arctic and temperate zones.

The following is from *The Daily News* of April 3:—"Novelties in Orchid (*sic*).—Some interesting novelties were to be seen at the usual fortnightly floral meeting of the Royal Horticultural Society. The Hon. Walter Rothschild was awarded a silver Banksian medal for an especially fine specimen of the Doryanthis (*sic*) Excelsa. This particular plant is rarely seen in England, and is very difficult to flower. The exhibit, however, which was over 10 feet high, had a splendid flower."

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CONTENTS

	PAGE
Euphrasia Vigursii, sp. n. By F. Hamilton Davey, F.L.S. (Plate 486)	217
Somerset Plant-Notes for 1906. By Rev. E. S. Marshall, M.A., F.L.S.	220
Alabastra Diversa.—Part XV. By Spencer le M. Moore, B.Sc., F.L.S.	226
Two New Japanese Potamogetons. By Arthur Bennett	233
Note on *Lyonsia*. By James Britten, F.L.S.	235
A New British Moss (*Fissidens algaricus* Solms). By H. N. Dixon, M.A., F.L.S.	237
Cephalanthera longifolia Fritsch.	240
Donax and *Schumannianthus*. By R. A. Rolfe, A.L.S.	242
A Point in Nomenclature. By James Britten, F.L.S.	244
Bibliographical Notes:— XLII.—Robert Brown's 'Prodromus'	246
Short Notes.—British Rubi.—Irish Plants	248
Notices of Books:— Introduction to Plant Ecology. By the Rev. G. Henslow, M.A., F.L.S.	249
Wild Flowers in their Seasons. By F. Edward Hulme, F.L.S., F.S.A.	249
How to Study Wild Flowers. By George Henslow, M.A., F.L.S., F.G.S.	249
Progressus Rei Botanicæ. Dr. J. P. Lotsy	252
Book-Notes, News, &c.	254

LONDON

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THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

The Journal of Botany was established in 1863 by Dr. Seemann. In 1872 the editorship was assumed by Dr. Henry Trimen, who, assisted during part of the time by Mr. J. G. Baker and Mr. Spencer Moore, carried it on until the end of 1879, when he left England for Ceylon. Since then it has been in the hands of the present Editor.

Without professing to occupy the vast field of general Botany, the Journal has from its inception filled a position which, even now, is covered by no other periodical. It affords a ready and prompt medium for the publication of new discoveries, and appears regularly and punctually on the 1st of each month. While more especially concerned with systematic botany, observations of every kind are welcomed. Especial prominence has from the first been given to British botany, and it may safely be said that nothing of primary importance bearing upon this subject has remained unnoticed.

Bibliographical matters have also received and continue to receive considerable attention, and the history of many obscure publications has been elucidated. Every number contains reviews of new and important books written by competent critics: in this as in every other respect a strictly independent attitude has been maintained. While in no way officially connected with the Department of Botany of the British Museum, the Journal has from the first been controlled by those whose acquaintance with the National Herbarium has enabled them to utilize its pages for recording facts of interest and importance regarding the priceless botanical collections which the Museum contains. In 1896 it became necessary to increase the size of the Journal, owing to the number of papers sent for publication: the number of plates was at the same time augmented.

Subscriptions (16s. post free) and advertisements (not later than the 24th of each month) should be sent to West, Newman & Co., 54, Hatton Garden, London; communications for publication and books for review to

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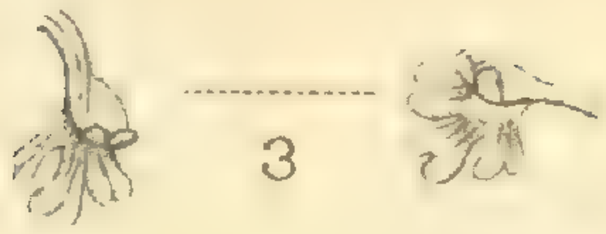

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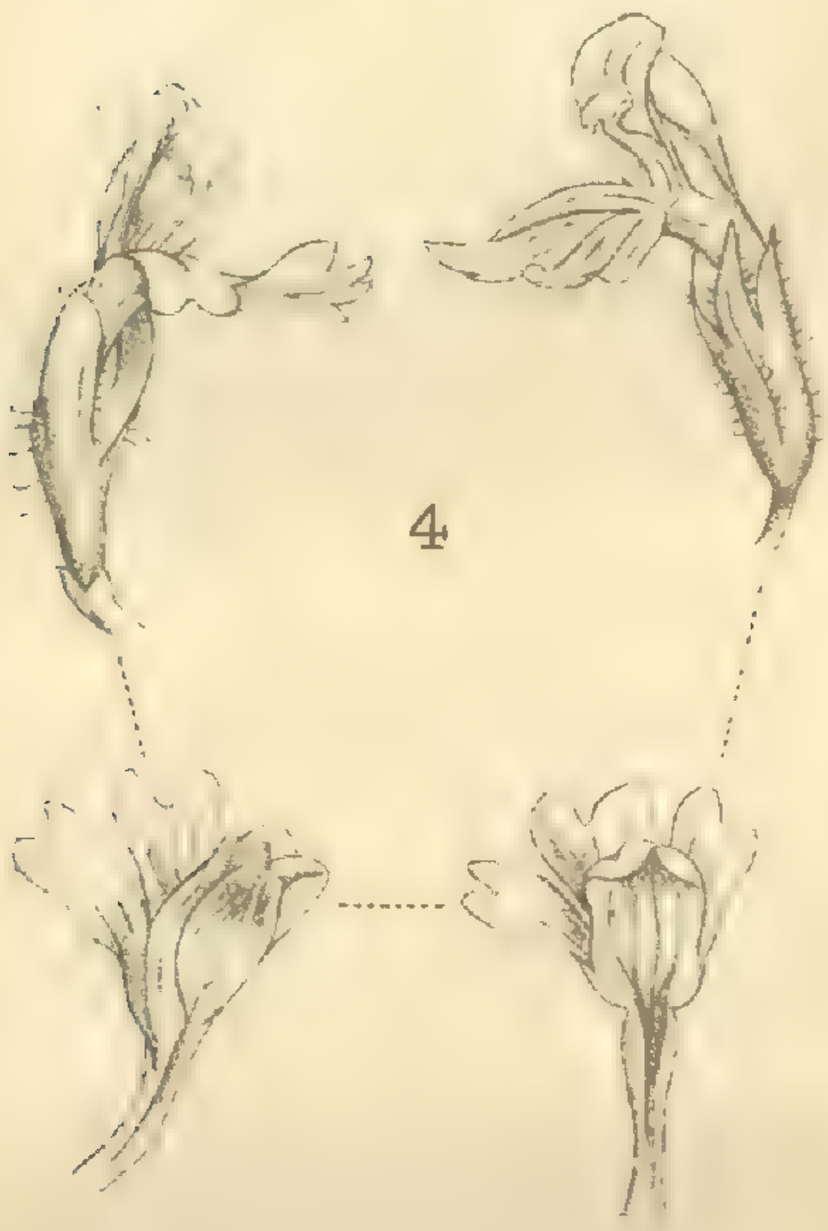

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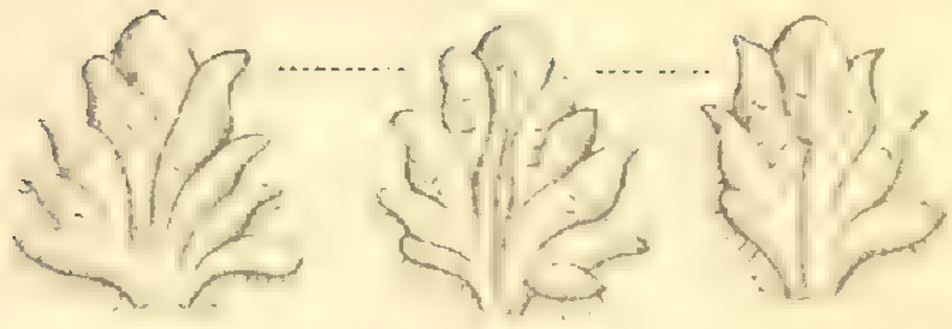

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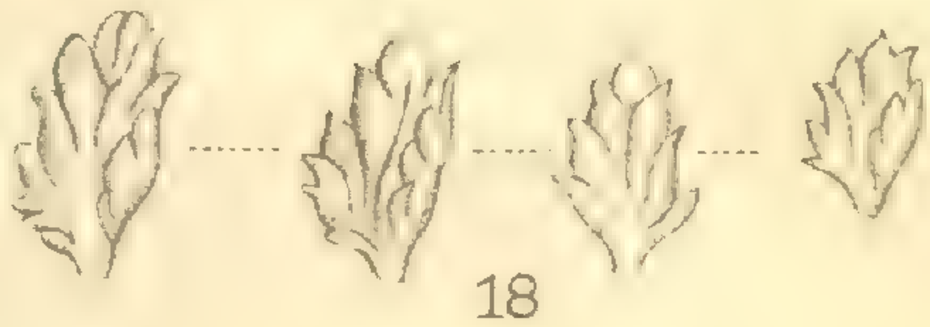

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Euphrasia Vigursii *Darey.*

EUPHRASIA VIGURSII, SP. N.

By F. Hamilton Davey, F.L.S.

(Plate 486.)

In the course of a few notes appearing in this Journal for 1906, pp. 131–2, I referred casually to a *Euphrasia* which I had gathered at Porth Towan, approximating towards *E. Rostkoviana*, but which the Rev. E. S. Marshall considered to differ materially from all described British forms. About four months after finding the plant, I sent several dried specimens to Prof. von Wettstein, at Prague, but as, unknown to me, the monographer of the genus *Euphrasia* had previously taken up his abode in Vienna, I have no doubt my package failed to reach him.

In September, 1906, while rusticating among the breezy uplands of the Dartmoor, South Devon, my friend, Dr. Vigurs, found an Eyebright with the same deep purplish or violet-blue flowers as my Porth Towan one, but much more slender in stem, branches, and leaves, more abundantly covered with gland-tipped hairs, and with the teeth of the leaves and bracts obviously more acute. About the same time another friend and enterprising co-worker, Mr. W. Tresidder, found in great abundance in Perranzabuloe parish, between Newquay and Perranporth, a plant in every detail agreeing with Dr. Vigurs's. My impression was that we had two species awaiting identification, or at any rate a species and a variety; but, as the sequel shows, what we had under consideration were really only two forms of the same species. Through the kind services of Prof. Hans Schinz, of Zurich, I was able to place in the hands of Prof. von Wettstein a number of specimens of each form, and his report shows that our *Euphrasia* is not only new to Britain, but, as far as Prof. von Wettstein is aware, also new to science. The following is a translation of the Professor's interesting letter:—

"The plant gave me much trouble, and has forced me to go through the whole of my English *Euphrasiæ* material. The result of this exact examination is that I cannot make the plant agree completely with any one described species. It comes nearest to *E. Rostkoviana*, though it is not nearly so hairy, and is altogether smaller in all its parts, including the corolla. The only other *Euphrasiæ* with which it can be compared are *E. brevipila* and *E. occidentalis* Wettst. With *E. brevipila* it agrees in the size and colour of the flower; but it certainly is not that species, the glands of which are too characteristic and constant to be mistaken. *E. occidentalis* has still smaller flowers, and never such long-curled glandular hairs as the plant in question. Moreover, *E. occidentalis* belongs to the same group as *E. curta* and *E. nemorosa*.

"How, then, shall the plant be named? To call it *E. Rostkoviana* is impossible; and without a knowledge of its distribution I should not care to describe it as a new form. The latter

course is, however, more admissible than to call the plant *E. Rostkoviana*. I should probably consider it a form of *E. Rostkoviana*, and naturally leave the name-giving and publication to the discoverer. Should it be found that the plant is widespread, and takes in its distribution the place of *E. Rostkoviana*, its description as a species would be quite as admissible as that of *E. campestris* Jord.

"From typical *E. Rostkoviana* the new plant differs by its smaller flowers (at the longest 8 mm.), the darker shade of its corolla, its smaller leaves, and the slenderness and delicacy of all its parts. Some of these marks appear in other varieties of *E. Rostkoviana*, i. e. the small flowers in var. *minoriflora* Borb., as well as on some Alpine species, and the purple corolla in var. *rubra* (Baumg.); but, as I have said before, I know of no plant which combines these characters as the one under notice.

"There is another reason which makes the plant more interesting still. *E. Rostkoviana* is well-defined and constant in the centre of the district in which it is found, but it varies very much on the boundaries of that district. On the south-west border of the area *E. campestris* has formed itself; on the east and south-east border there is very often a kind which is very sparingly hairy. In the north-east of the area *E. fennica* Kihlm. has formed itself out of *E. Rostkoviana*. It might be possible that in the north-west of the area of *E. Rostkoviana* such a representative plant as that now before me has been formed. This view is supported by the fact that I have several times seen extremely small-flowered *E. Rostkoviana* from England.

"Concerning the two specimens I have been dealing with, I believe them to be one and the same form, the absence or presence of gland-tipped hairs, as well as the difference in the time of flowering [June in one case, September–October in the other], being associated with certain local conditions."

It is deserving of record that, quite independently of Prof. von Wettstein's investigations, the Rev. E. S. Marshall recently arrived at the same conclusion. Writing me shortly after I had heard from the Vienna botanist, Mr. Marshall said:—"I have now your Porth Towan sheet, June 21st, 1905, and Dr. Vigurs's Roborough sheet, September 18th, 1906, side by side before me. Allowing for the difference of the season (and most of our plants flower from June to September), there does not seem to be any very material difference, except that the S. Devon plant has even the lowest leaves more or less glandular, and, indeed, the glands are more numerous throughout. . . . Nor, in the specimens before me, is there any material difference in the leaf-outline; and both have very crowded leaves. . . . I have always thought that these Devon and Cornwall plants came nearest to *Rostkoviana* of our forms, but were distinct from it and *brevipila*. Usually, at any rate in the South of England, *Rostkoviana* is a very well-marked and fairly uniform plant, though the size of the flowers varies (perhaps according to situation and luxuriance). As to the colour of flowers in *brevipila*, I have seen a great deal of that species, and

in N. Scotland have found it pretty brightly coloured, but I never yet came across flowers of *brevipila* with this *deep violet-blue* tint. . . . *E. Rostkoviana* I never yet found with decidedly blue flowers; they are normally *whitish*. The variation of outline in the leaves of your plant and Dr. Vigurs's is certainly no greater than in those of authentic *curta* var. *glabrescens*; I think that small early-flowering specimens tend to have them blunter than those of more developed late summer and early autumn."

I propose naming the new plant after Dr. C. C. Vigurs, who has long been an ardent student of British *Euphrasiæ*, and to whom, *inter alia*, we are indebted for the discovery of *Fumaria occidentalis* Pugsley.

Euphrasia Vigursii, sp. n. Stem erect or slightly ascending, simple or branched from or slightly above the middle, 5–25 cm. in height; branches opposite, ascending, rarely compound, covered with crisped, jointed, recurved pubescence, and (in the upper part) numerous more or less straight gland-tipped hairs. Leaves in early-flowering plants greyish-green, plicate-striate, oval-ovate, with 3–4 rounded teeth on either side; in late-flowering plants ovate, with 3–4 acute but not awned teeth on either side; all abundantly furnished with long gland-tipped hairs and numerous white setæ. Bracts subopposite, or lower ones rarely opposite, upper about as broad as long with 4–5 triangular acute teeth on either side; under surface closely set with gland-tipped hairs. Spike at first short, ultimately, in typical specimens, lengthening to 15–20 cm. Calyx not enlarged in fruit, like the rest of the foliage densely set with gland-tipped hairs; teeth narrow-triangular, acute. Corolla rarely exceeding 8 mm., rich purplish violet with darker lines and three yellow spots on the lower lip, tube ultimately longer than the calyx. Capsule elliptical, about twice as long as broad, falling short of the calyx-teeth, emarginate, ciliate.

Hab. On killas or clay-slate in Cornwall and Devon. Cornwall (v.-c. 1): Exposed heathy slope near the sea at Porth Towan; Connor Downs. Goonhavern Moor and other places in Perranzabuloe parish, *W. Tresidder*. Devon (v.-c. 3): Roborough Downs, near Yelverton, *C. C. Vigurs*.

E. Vigursii differs from *E. Rostkoviana* by the more slender character of all its parts, its less-branched stem, smaller and less hairy leaves, shorter corolla, which is of a striking purplish violet instead of white or lilac; and its relatively shorter capsule. From *E. brevipila* it may be distinguished by its longer and greater abundance of gland-tipped hairs, by the teeth of its leaves being fewer and never awned, by its much deeper coloured corolla, the tube of which lengthens after the flower opens, and by its shorter and more distinctly emarginate capsule.

I take this opportunity of expressing my gratitude to Prof. von Wettstein, Prof. Hans Schinz, and the Rev. E. S. Marshall for their kind assistance.

EXPLANATION OF PLATE 486. — 1 and 2, Early-flowering specimens of *Euphrasia Vigursii*, natural size; 3, Corollæ, natural size; 4, Same, × 6;

5, Capsule, natural size; 6, Same, × 6 (two of the figures show the capsule enclosed by the calyx); 7, Stem, × 6; 8, Bracts, natural size; 9, Same, × 6; 10, Upper leaf, natural size; 11, Same, × 6; 12, Lower leaves, natural size; 13, Same, × 6 (8–13 prepared from dried specimens of the late-flowering plant); 14, Lower leaves, natural size, from fig. 1; 15, Same, × 6; 16, Upper leaves, natural size; 17, Same, × 6; 18, Bracts, natural size, from fig. 2; 19, Same, × 6.

SOMERSET PLANT-NOTES FOR 1906.

By Rev. E. S. Marshall, M.A., F.L.S.

My excursions in the county last season were but few; some of them were undertaken in the company of friends, to whom several of the discoveries are due. An asterisk denotes what is believed to be a new vice-comital record; districts 1, 2, 3, 4, 6 being in 5. S. Somerset, the rest in 6. N. Somerset.

Ranunculus Drouetii F. Schultz. 8. Ditches, Shapwick. — *R. heterophyllus* Web. 5. Ditches about Dunball. — *R. Lenormandi* F. Schultz. 6. Near Chard.—*R. sceleratus* L. 3. Kingston.—*R. parviflorus* L. 2. Near Minehead. 5. Dunball.

Castalia alba Greene. 8. In a pond by the main Great Western line, east of Burnham.

Glaucium flavum Crantz. 2. Blue Anchor.

Fumaria capreolata L. (*F. pallidiflora* Jord.). 2. Minehead.—*F. Boræi* Jord. and *F. Bastardi* Boreau (*confusa* Jord.). 2. Minehead; these are evidently, as I suggested last year (p. 116), the *F. confusa* and *F. muralis* of Murray's *Fl. Som.* *F. Boræi* was also observed at 3. Cothelstone.

Barbarea intermedia Boreau. 2. Roadside near Dunster, sparingly. 3. In considerable quantity by the road to Broomfield, north of New Cross, W. Monkton.

Brassica nigra Koch. 3. Hedges near Bathpool, W. Monkton. 9. Berrow.

Reseda Luteola L. 5. Dunball.

Viola sylvestris Lam. 1. Wood-border near Dulverton Station.

Polygala serpyllacea Weihe. 2. Frequent near Minehead.

Stellaria neglecta Whe. var. *umbrosa* (Opiz.). 2. Minehead. 6. Near Chard.

Sagina apetala Ard. 2. Dunster.—*S. ciliata* Fr. 3. Cothelstone Beacon (1080 ft.).

Spergularia rubra Pers. 3. Cheddon Fitzpaine.—*S. salina* Presl. var. *neglecta* (Kindb.). 2. Blue Anchor. 8. Burnham.—*S. marginata* Syme var. **glandulosa* Druce. 8. By the tidal Brue, near Burnham; very well-marked and luxuriant.

Malva rotundifolia L. 2. Washford.

Geranium Robertianum L. var. *modestum* (Jord.). 9. Uphill. I believe that the Cheddar plant of *Fl. Som.* should be referred to this rather than to var. *purpureum*.

Genista anglica L. 6. Moory ground east of Chard.

Ulex Gallii Planch. 3. Near Kingston; a slender woodland state.

Ononis repens L. var. *horrida* Lange. 8. Sandhills north of Burnham. 9. Very scarce near Uphill, on limestone.

Medicago denticulata Willd. 5. Grassy slopes on the Lias, close to Dunball Station; evidently native here (in *Fl. Som.* it was classed as a colonist).

Melilotus officinalis Lam. 2. Pasture near Minehead; scarce, and perhaps only a casual.

Trifolium medium L. 3. Near Kingston. — *T. hybridum* L. 3. Naturalised by a roadside near Hestercombe, between W. Monkton and Kingston. — *T. fragiferum* L. 4. Staple Fitzpaine. 9. Salt-marshes near Uphill; frequent.

Vicia angustifolia L. 3. Kingston. 8. Puriton. — *V. bithynica* L. 2. A specimen sent to me by Dr. C. R. Killick from between Williton and St. Audries exactly matches authentic var. *angustifolia* Syme.

Rubus rhamnifolius Wh. & N. 2. Common about Minehead.— *R. Borreri* Bell Salt var. *dentatifolius* Briggs. 9. Sandy coast, north of Berrow, in two somewhat different forms; named by Mr. J. W. White. — *R. Koehleri* Wh. & N. subsp. *dasyphyllus* Rogers. 2. Near Minehead; determined on the spot by Rev. A. Ley.—*R. corylifolius* Sm. var. *cyclophyllus* Lindeb. 2. Washford.

Potentilla procumbens Sibthorp. 3. Cothelstone Hill. — *P. procumbens* × *sylvestris*. 2. Dunster, *Ley* sp. 8. Near Shapwick Station.

**Agrimonia odorata* Mill. 2. Rev. R. P. Murray has lately identified as this species, not previously known for the county, a plant which he collected many years ago near Minehead.

Rosa agrestis Savi, var. 9. On limestone, near Uphill. This appears to be the form recorded as var. *inodora* (Fr.) from several stations in *Fl. Som.* Major Wolley-Dod's note on it was as follows:—"A most interesting plant. The globose fruit at once removes it from *sepium*, *agrestis* (if they are really different), and *inodora* Fr., which Déséglise makes a synonym of *sepium* Thuill. I believe it to be the true *arvatica* Pug.; it belongs to the *agrestis* group"; though he afterwards wrote that the fruit was more ovoid in *R. arvatica*. I should not separate it from the *sepium* of Kent and Surrey as more than a variety. — *R. obtusifolia* Desv. 3. Between Cothelstone and Kingston.

Pyrus Malus L. var. *mitis* Wallr. 2. Blue Anchor. 6. Near Chard.

Chrysosplenium oppositifolium L. 3. About Kingston. 6. Near Chard.

Sedum rupestre L. 2. The plant so named from the coast near Minehead (where it is evidently indigenous), Rev. A. Ley and I would rather refer to *S. Forsterianum* Sm.; we have gathered it wild, and watched it in cultivation. But it is not unlikely that both species may occur there, as I have *S. rupestre* var. *minus* Syme from Lynton, sent by Mr. Hunnybun.

Callitriche intermedia Hoffm. (*hamulata* Kuetz.). 1. Near Dulverton. 9. Pool, north of Berrow Church.

Lythrum Salicaria L. 3. N. Curry.

Epilobium lanceolatum Seb. & Maur. 8. Wells, *S. H. Bickham, in litt.*—*E. roseum* Schreb. 2. Washford.—**E. Lamyi* F. Schultz. 1. Roadside near Dulverton.—*E. palustre* L. 9. Berrow.

Œnothera. The plant long naturalized on the sandhills near Berrow struck me as being different from ordinary *Œ. biennis* L. Specimens were sent to Dr. Focke, who replied thus:—"Your Somersetshire *Œnothera* indeed appears to agree with the form which I have distinguished as *Œ. ammophila.* It belongs, perhaps as a subspecies, to *Œ. muricata*, with which it has this point in common, that the leaf-rosette rises above the ground on a short stalk at the end of the first summer. In *Œ. biennis* there is no such overground stalk. In the size of its flowers *Œ. ammophila* comes midway between *Œ. biennis* and *Œ. muricata.* So far as I can see, your Somerset plant agrees in all material points with the *Œ. ammophila* which we have here; whereas I have received from the sandy Lancashire coast *Œ. Lamarckiana*, the flowers of which are larger than those of *Œ. biennis.*" A note on *Œ. ammophila* will be found in *Journ. Bot.* 1905, p. 32. I believe that the evening primrose which grows in profusion on the Carmarthenshire sandhills near Pembrey and Kidwelly is the same thing.

Hydrocotyle vulgaris L. 9. Berrow; Weston-super-Mare.

Bupleurum tenuissimum L. 9. Uphill.

Apium nodiflorum Reichb. fil. var. *pseudo-repens* H. C. Wats. 9. Damp sandy coast near Berrow. This (var. *ocreatum* Bab., non DC.) is probably the "var. *repens* (Koch)" of *Fl. Som.*

Crithmum maritimum L. 2. Two remarkably fine plants were seen on the shingly coast near Minehead Warren.

Caucalis arvensis Huds. 2. Washford.—*C. nodosa* Scop. 3. Near Kingston.

Adoxa Moschatellina L. 1. Dulverton.

Viburnum Opulus L. 3. Near Kingston.

Rubia peregrina L. 2. Washford.

Galium Cruciata Scop. 3. Cothelstone.

G. Mollugo L. var. *Bakeri* Syme. 3. W. Monkton; named while growing by Mr. Ley, who also found it near Dunster.

G. palustre L. var. *elongatum* (Presl). 5. Dunball. 9. Berrow. —Var. *Witheringii* (Sm.). 3. Between Cothelstone and Kingston. 6. Chard Common.

Valeriana dioica L. 6. Near Chard.

Inula vulgaris Trevisan (*I. Conyza* DC.). 3. Cothelstone. 8. Puriton.

Bidens tripartita L. 2. Near Dunster.

Matricaria inodora L. var. *salina* Bab. 2. Blue Anchor. 8. Burnham.

Artemisia vulgaris L. 6. Chard.

Petasites ovatus Hill (*officinalis* Moench). 4. Chaffcombe.

Mariana lactea Hill. 2. Between Watchet and Washford; near Dunster. 3. W. Monkton (one plant, casual). 5. Abundant on the borders of a hanging wood at Dunball, where it has quite the appearance of a native on the Lias.

Picris echioides L. 5. Dunball. 9. Uphill.

Hieracium Pilosella L. var. *nigrescens* Fr. 9. Cheddar Gorge.—Var. *concinnatum* F. J. Hanb. 3. Cothelstone Hill. 9. Cheddar Gorge.—*H. Schmidtii* Tausch. The Cheddar plant formerly so called has now been identified by Mr. Ley as his *H. cyathis*; the Minehead *Schmidtii* being referred by Rev. W. R. Linton to var. *deveniense* F. J. Hanb.—*H. vulgatum* Fr. The Cheddar plant placed here in *Fl. Som.* is *H. sciaphilum* Uechtr., a very distinct species.—*H. rigidum* Hartm. var. *trichocaulon* Dahlst. 3. Hedge-banks below Buncombe Hill, Kingston. "Much like the English plant so named. The Scandinavian plant has longer, narrower leaves, less toothed, and many fine glands on the heads; so that your plant is not exactly it," *W. R. Linton, in litt.* Nominally a new county record, but very likely included under *H. tridentatum* Fr. in *Fl. Som.* I greatly doubt the occurrence of true *H. gothicum* Fr. in this southern county, but have not seen the Ebbor plant which has been referred to it.—*H. umbellatum* L. Lane near Kingston; a form approaching var. *coronopifolium* Fr.

Leontodon hirtus L. 3. Cothelstone.

Taraxacum lævigatum DC. 3. Wall-tops, Cothelstone; agrees very well with De Candolle's description in the *Prodromus*. What seems to be the same thing, dwarfed, ascends to over 1000 ft. on Cothelstone Hill.—*T. palustre* DC. 5. Low ground near Dunball, sparingly.—*T. udum* Jord. 1. Dulverton. 6. Plentiful near Chard; I saw no good *T. palustre* thereabouts.

Limonium vulgare Mill. 8. Bank of the Brue, between Burnham and Highbridge; locally plentiful.

Lysimachia vulgaris L. 2. Swamp near Minehead Warren.

Anagallis arvensis L. 9. Native on the sandy coast near Berrow.

Ligustrum vulgare L. 5, 8. Native on the Lias about Dunball and Puriton.

Vinca major L., *V. minor* L. 1. Roadside hedges near Dulverton; not native.

Blackstonia perfoliata Huds. 2. Washford.

Centaurion umbellatum Gilib. (*Erythræa Centaurium* Pers.). 3. W. Monkton; Kingston.

Myosotis cæspitosa Schultz. 2. Near Minehead. 9. Berrow.—*M. palustris* Relh. 2. Washford.—*M. repens* G. & D. Don. 2. Washford. 3. Near Kingston.—*M. versicolor* Sm. 3. Cothelstone. 9. Shapwick.

Solanum nigrum L. 9. Coast, Berrow.

Hyoscyamus niger L. 9. Sandhills, Berrow; scarce, but probably native.

Verbascum Thapsus L. 3. Cothelstone. 9. Berrow.

Veronica officinalis L. 3. Common near Kingston and Cothelstone.—*V. Anagallis-aquatica* L. 5. Dunball. 9. Berrow (flowers white and rose).

Euphrasia Rostkoviana Hayne. 8. Shapwick.

Pedicularis sylvatica L. 6. Common on moory ground near Chard.

Mentha longifolia Huds. 9. Roadside green near Berrow;

scarce, and probably escaped.—*M. arvensis* × *hirsuta* (*M. sativa* L.). 2. Near Minehead. 3. Between W. Monkton and Kingston.

Scutellaria galericulata L. 9. Damp hollows of the sandhills, Berrow.

Lamium Galeobdolon Crantz. 3. Woods near Kingston.

Teucrium Scorodonia L. 9. Berrow sandhills.

Chenopodium polyspermum L. 3. Cheddon Fitzpaine; also very plentiful and fine by the roadside near Hestercombe.—*C. murale* L. 9. Sandy ground near Berrow Church; scarce.—*C. rubrum* L. 3. Cheddon Fitzpaine. 8. Burnham.—*C. Bonus-Henricus* L. 3. W. Monkton; Cothelstone Beacon.

Beta maritima L. 2. Blue Anchor.

Atriplex deltoidea Bab. 2. Blue Anchor. 8. Burnham.—*A. laciniata* L. 8. Very sparingly at Burnham. This confirms the old record for the county; it was placed among "excluded species" in *Fl. Som.*—*A. portulacoides* L. 8. One fine patch on the muddy bank of the River Brue, near Burnham; very rare in Somerset.

Salicornia stricta* Dum. 8. With the last-named, near Burnham; small and poor. 9. Near the mouth of the Axe, Uphill; very characteristic, but by no means abundant. N.B.—Only aggregate *S. herbacea* L. is noted in *Fl. Som.*—S. procumbens* Sm. 8. In profusion on muddy ground near the Brue, between Burnham and Highbridge.—**S. ramosissima* Woods. 8. Fine, but rather scarce, by the tidal Brue, Burnham. 9. Abundant near the mouth of the Axe, Uphill.—*S.* —— ?. 2. An interesting plant, small, branched, erect, grass-green tending to become red, was found at Blue Anchor; it is perhaps nearer to *S. pusilla* Woods than any other of our named forms, but tends towards *S. ramosissima*.

Suæda maritima Dum. 9. Salt-marsh, Uphill, in great quantity.

Salsola Kali L. 9. Berrow; Uphill.

Polygonum aviculare L. var. *arenastrum* (Boreau). 2. Coast near Dunster.—Var. *rurivagum* (Jord.). 2. Blue Anchor, associated with var. *agrestinum* (Jord.).—*P. Raii* Bab. 8. Burnham; very scarce and local. Confirms the record for N. Somerset.

Rumex limosus Thuill. 9. Roadside green near Berrow; several plants were remarkably strong, fully four feet high.—*R. pulcher* L. 2. Roadside, Dunster.

Daphne Laureola L. 4. Hatch Beauchamp. 5. Dunball. 8. Puriton.

Urtica urens L. 3. Cothelstone Hill, at 1080 ft.

Parietaria officinalis L. 3. Cothelstone.

Salix aurita L. 6. Near Chard.

Spiranthes spiralis Koch (*autumnalis* Rich.). 9. Uphill, on limestone.

Epipactis longifolia All. (*palustris* Cr.). 9. Damp hollows of the sandhills north of Berrow.

Orchis latifolia L. 6. Near Chard. 9. Weston-super-Mare.—*O. ericetorum* Linton. 2. Minehead; Stogumber.

Ophrys apifera Huds. 9. Berrow sandhills.

Iris fœtidissima L. 5, 8. In plenty about Dunball and Puriton.

Galanthus nivalis L. 1. Native, I believe, by stream-sides near Dulverton; also at Edford Wood, near Frome (dist. 10). In both places it is associated with the daffodil.

**Allium Ampeloprasum* L. 2. Minehead Warren; one good patch. It is browsed off by animals; and I only ascertained the species by digging up a few bulbs, which flowered the following summer. Certainly not an escape from cultivation in this case; I can only guess that seed may have been water-borne from Steep Holm, as it is the same form (*genuinum* Syme).

Colchicum autumnale L. 3. Buncombe Wood, near Kingston.

Juncus maritimus Lam. 9. Sandy coast, Berrow; I only noticed one plant, but was unaware at the time of its rarity in the county.

Luzula Forsteri DC. 3. W. Monkton; very local.

Typha latifolia L. 5. Dunball.

**Alisma lanceolatum* With. 9. In a tiny pool among the Berrow sandhills with *Chara vulgaris* L. A single fruiting specimen and several seedlings; very characteristic.

Sagittaria sagittifolia L. 3. N. Curry.

Potamogeton flabellatus Bab. var. *scoparius* Fryer. 8. Brackish pool between Burnham and Highbridge, with *Zannichellia pedicellata* Fr.

Scirpus maritimus L. 9. Uphill.

Carex muricata L. 2. The large Dunster plant (Ref. No. 2925) mentioned last year proved to be only this (*C. contigua* Hoppe, *teste Kükenthal*).—*C. divulsa* Stokes. 3. Kingston; Cothelstone.—*C. remota* × *vulpina* (*axillaris* Good.). 3. Roadside between Cothelstone and Kingston.—*C. panicea* L. 6. Near Chard, in plenty.—*C. hirta* L. 2. Washford. 9. Berrow.

Agrostis canina L. 2. Dunster.

A. setacea Curt. 6. Sandy roadside bank near Chard, towards Winsham.—*A. tenuis* Sibth. (*vulgaris* With.) var. *pumila* (L.). 3. Cothelstone Hill, associated with *Cerastium quaternellum*.

Calamagrostis epigejos Roth. 8. Puriton.

Aira præcox L. 8. Shapwick.

Molinia cærulea Moench. 4, 6. Plentiful in moory ground near Chard.

Catabrosa aquatica Beauv. 2. Washford.

**Poa nemoralis* L. 3. Roadsides between Cheddon Fitzpaine and Broomfield; Cothelstone.

Glyceria plicata Fr. 2. Washford; Dunster. 3. Trull; between Cothelstone and Kingston.—**G. declinata* Bréb. 2. Greenaleigh, near Minehead. 6. Near Chard. Hitherto overlooked in the county, though likely to be frequent.—*G. aquatica* Wahlb. 3. Bathpool, W. Monkton. 5. Dunball. 9. Berrow; near Brent Knoll Station.

Festuca Myuros L. 3. Cothelstone; Durston.—*F. bromoides* L. (*sciuroides* Roth). 8. Shapwick.—*F. rubra* L. var. *pruinosa* Hackel. 2. Coast near Greenaleigh Point. 9. Berrow; Clevedon, *Miss Livett* sp.—*F. elatior* L. 3. Bathpool. 9. Cheddar.—**F. arundinacea* Schreb. 2. A few plants on the pebbly beach at Blue Anchor.

Bromus ramosus Huds. 2. Dunster. 3. Bishop's Lydeard.—*B. racemosus* L. 8. Shapwick.

Hordeum nodosum L. (*secalinum* Schreb.). 9. Uphill.

Asplenium Adiantum-nigrum L. 6. Near Chard.

Lastrea Filix-mas Presl var. *paleacea* Moore. 2. Near Minehead. 6. Frequent near Chard.

Ophioglossum vulgatum L. 8. Shapwick.

ALABASTRA DIVERSA.—Part XV.

By Spencer le M. Moore, B.Sc., F.L.S.

1. New or rare Acanthaceæ from German South-West Africa.

Mr. T. G. Een's remarkable collection of Damaraland plants, acquired by the Trustees of the British Museum in 1879, has been mentioned several times in this Journal, and the recent discovery of a small overlooked bundle of *Acanthaceæ* is sufficient warrant for the following further notice. No full list is given, but only the rarer plants are referred to, and those which seem to be new described.

Ruelliopsis damarensis, sp. nov. Caule repente subtetragono sparsim albido-hispidulo mox minute puberulo, foliis oblanceolatis obtusis basi in petiolum brevem angustatis subsessilibusve leviter crassiusculis pilis paucis patulis hispidis albis exemptis glabris, floribus secus ramulos brevissimos dispositis, bracteolis seu foliis floralibus lineari-oblanceolatis obtusis calyci subæquilongis, calycis lobis inter se aliquanto inæqualibus adusque $\frac{1}{3}$ connatis linearibus obtusiusculis marginibus hispide ciliatis, corollæ pro rata parvæ tubo superne gradatim amplificato extus minute puberulo limbi lobis late obovatis obtusissimis, staminibus inclusis, antherarum loculis æqualibus oblongis basi mucronulatis, pollinis granis subsphæroideis circa 12-costatis 3-porosis, ovario late oblongo compressiusculo apice microscopice puberulo ceterum glabro, stylo puberulo, ovulis quoque in loculo sæpissime 3, capsula oblonga juxta apicem attenuata apice obtusa.

Ramuli floriferi summum 1·0 cm. long. Internodia solemniter 2·0–3·0 cm. long. Folia ± 2·0 × 0·5 cm., in sicco dilute viridia; petioli lati, summum 0·3–0·4 cm. long. Bracteolæ circa 1·0 × 0·2 cm., pilis hispidulis perpaucis exceptis glabræ. Calycis tubus circa 0·4 cm., lobi ± 0·9 cm. long. Corolla extus puberula, in toto 1·5 cm. long; tubus 1·0 cm. long, basi 0·2 cm. faucibus 0·7 cm. diam.; lobi 0·5 × 0·45 cm. Filamenta vix 0·2 cm., antheræ ægre 0·3 cm. long. Capsula circa 0·9 cm. long., 0·25 cm. lat. Semina quoque in loculo sæpe (nec nisi fallor sæpissime) 2, ambito oblongo-ovata, villosa, 0·3 cm. long.

Aberrant from the genus by reason of the calyx tubular below, the ovary cells with three ovules (instead of four), and the at least often 4-seeded capsules. Judging, however, from the enlarged ovules of flowers from which the corolla has already fallen, the

capsule should sometimes have six seeds, although I did not succeed in finding such.

Petalidium damarense, sp. nov. Fruticulosum ramis ramulisque subtetragonis his bene foliosis ut novelli arcte minutissimeque tomentosis pilis omnibus simplicibus, foliis homomorphis petiolatis oblongis vel anguste oblongo-obovatis obtusis vel obtusissimis nonnunquam emarginatis minute tomentosis deinde glabrescentibus, floribus in axillis solitariis subsessilibus, bracteolis ovato-oblongis obtusiusculis membranaceis dilute viridibus vel fere decoloribus eleganter nervosis extus minute sed dense griseo-pubescentibus intus dimidio abaxiali appresse pubescentibus, calycis minute pubescentis lobis anticis lanceolato-oblongis fere omnino coalitis lobo postico antico simili apice obtuso lobis lateralibus reliquos fere æquantibus lineari-lanceolatis acuminatis, corollæ tubo bracteolas excedente recto superne leviter ampliato ubi pubescente ceterum glabro intus in faucibus sericeo limbo bilabiato lobis obovatis obtusissimis, staminibus subinclusis filamentis inferne piloso-puberulis antherarum loculis basi aristulatis, ovario glabro, stylo pubescente infra apicem glabro, stigmatis lobis inæqualibus, capsula ovoidea disperma.

Folia solemniter 1·5–2·0 cm. long., 0·5–1·2 cm. lat., in sicco viridi-lutescentia, juniora griseo-viridescentes; petioli sæpissime 0·2–0·6 cm. long., tomentosi. Bracteolæ circa 1·0 × 0·6 cm. Calycis tubus 0·15 cm., lobi laterales 0·5 cm., reliqui 0·65 cm. long. Corollæ tubus 1·4 cm. long., inferne vix 0·3 cm., faucibus 0·4 cm. diam.; lobi 0·5 × 0·4 cm. Filamenta 0·3–0·4 cm. long.; antheræ 0·22 cm. Ovarium 0·16 × 0·16 cm.; stylus 1·0 cm. long.; stigmatis lobus alter 0·15 cm., alter 0·075 cm. long. Capsula 1·0 cm. long., pallida, nitidula.

The material consists of two small specimens, respectively 6 cm. and 8 cm. high, which appear to have been removed at their point of emergence from the soil, though certainty on the point is not possible. The only species they at all resemble is *P. physaloides* S. Moore, which, on account of its stellate hairs, is placed in a different position in the genus. Other points of difference are the narrower, greener, closely-pubescent bracteoles, the obtuse not acuminate hinder lobe of the calyx, and the longer tube of the corolla, &c.

P. HALIMOIDES S. Moore in Journ. Bot. 1880, 228.

This is the true plant (= *Barleria halimoides* Nees), and not *P. loranthifolium* S. Moore, which Mr. Clarke unites with the above, I cannot but think with insufficient warrant.

Petalidium Eenii, sp. nov. Fruticulosum, humile, caule e radice elongato lignoso ascendente cito ramoso ramis minute sed dense pubescentibus crebro foliosis novellis pilis simplicibus brevissimis arcte albo-tomentosis, foliis lineari-oblongis apice obtusis necnon pungentibus basin versus in petiolum sat longum gradatim extenuatis minute griseo-tomentellis, floribus in cymis paucifloris glomeratis digestis ramulorum fertilium foliis anguste linearibus acutis patule hispide ciliatis, bracteolis ovato-lanceolatis

breviter acuminatis membranaceis viridibus puberulis, calycis puberuli lobis anticis breviter connatis oblongis lobo postico lineari-lanceolato quam lateralia linearia paullulum longiore lobis omnibus acutis, corollæ tubo extus sursum pubescente bracteolas paullulum excedente leviter incurvo superne dilatato faucibus intus pilis hispidis decurvis onusto limbo subbilabiato lobis brevibus oblongo-obovatis emarginatis, filamentis basi puberulis antheris aristatis, stylo inferne puberulo, stigmatis lobis inter se parum inæqualibus, capsula ——.

Plantula vix 10·0 cm. alt. Ramulorum sterilium folia modice 2·5–3·0 cm. long., 0·7 cm. lat.; petioli summum circa 1·0 cm. long., tomentosi; ramulorum fertilium folia 1·0 × 0·1 cm., horum pili 0·1–0·2 cm. long. Bracteolæ vix 1·0 cm. long., 0·45 cm. lat., harum nervæ mediocriter prominulæ. Calycis lobus posticus 0·6 cm. long.; lobi laterales 0·55 cm.; loborum anticorum pars libera modo 0·1 cm. long. Corollæ tubus 1·7 cm. long.; deorsum 0·2–0·25 cm. faucibus 0·8 cm. diam.; limbus 1·2 cm. diam.; lobi circa 0·4–0·5 × 0·45 cm. Filamenta longiora 0·5 cm., breviora 0·25 cm. long.; antheræ 0·3 cm. long. Stylus fere 1·5 cm., stigmatis lobus alter 0·125 cm., alter 0·075 cm. long.

Differs from *P. Lepidagathis* S. Moore, in the indumentum, the much smaller leaves of the barren shoots, the corolla-tube dilated above and closely pubescent, &c.

Blepharis grisea, sp. nov. Humilis ramis e radice elongato valido sparsissime ramuloso ascendentibus fastigiatis sursum ramulos fertiles breves foliosos minute pubescentes gignantibus et ramulos abbreviatos steriles basi spiniferos, foliis sæpissime oppositis raro approximatis et tunc vix inæqualibus lineari-oblongis obtusis apice ipso breviter spinosis vel mucronatis interdum vero inermibus basi in petiolum brevem leviter angustatis margine sparsim dentato-spinulosis vel integris subcoriaceis minute griseo-pubescentibus, ramulorum sterilium spinis rigidis etsi attenuatis simplicibus patentibus quam folia sæpissime brevioribus, floribus in spicis abbreviatis ramulos terminantibus pauci- (2–3-) floris dispositis, bracteis pro spica paucis sæpissime oblongo-obovatis (per-paucis extimis oblongis) apice spinis 3–5 patentibus quarum laterales debiliores sunt necnon breviores quam intermedia coronatis decoloribus prominenter 5-nervosis minute griseo-pubescentibus, bracteolis anguste linearibus acutis margine ciliatis a bracteis superatis, calycis minute pubescentis lobo antico oblongo-ovato dentibus acutis quam posticus ovato-lyratus apice emarginatus breviore lobis lateralibus lanceolatis acutis, corollæ calycem bene excedentis labio antico 3-lobo lobis oblongo-obovatis emarginatis adjecto utrinque dente parvo obtuso, ovario ovoideo-oblongo apice breviter angustato glabro, stylo inferne puberulo ubi aliquantulum incrassato, capsula ——.

Planta circa spithamea. Folia 1·5–2·5 cm. long., 0·4–0·7 cm. lat., in sicco viridi-grisea; costa centralis crassa, reliquæ haud aspectabiles. Spinæ ramulorum sterilium sæpissime 0·7–1·7 cm. long. Spica (corollis inclusis) 2·5 × 1·5 cm. Bracteæ (limbus) 1·2 × 0·7 cm.; harum spina intermedia 0·6–0·7 cm., laterales

0·2–0·4 cm. long.; extimæ circa 0·6 × 0·3 cm.; harum spina terminalis 1·0 cm. long. Bracteolæ 0·7 × 0·1 cm., eminenter 1-nervosæ. Calycis lobus anticus 1·1 cm. long., ejus dentes lineari-lanceolati, 0·2 cm. long.; lobus posticus 1·7 cm. long., inferne 0·6 cm., superne 0·3 cm. lat.; lobi laterales 0·7 cm. long. Corolla 2·5 cm. long.; tubus 0·4 cm., limbus summum 1·1 cm. lat.; lobi 0·4 cm. long. Ovarium 0·2 cm., stylus 1·0 cm. long.

Recognized by the grey pubescence, the linear-oblong entire or weakly spinous leaves, the few-flowered spikes, and the bracteoles.

Barleria (§ Prionitis) **Eenii**, sp. nov. Fruticulosa caule tetragono primo puberulo cito glabro inferne nudo superne paucifolioso, foliis parvis brevipetiolatis oblongis apice obtusis (nonnunquam emarginatis) ipso mucronatis basi paullo angustatis pilis paucis strigosis appressis costæ costulisque adspersis exemptis glabris creberrime glandulosis in sicco viridi-lutescentibus, spinis interpetiolaribus dum adsint brevibus rectis debilibus, floribus in pseudospica terminali abbreviata pauciflora dispositis, bracteis calycem æquantibus vel ab iis superatis spathulato-oblongis apice obtusissimis ipso mucronatis fac. inf. costis costulisque pilis strigosis appressis copiose onustis, bracteolis lineari-subulatis bracteas sæpe subæquantibus debilibus glabris, calycis lobo antico bidentato ut lobus posticus sursum gradatim attenuatus ovato-lanceolato lobis lateralibus reliquis æqualibus vel etiam paullo longioribus lanceolatis sursum attenuatis omnibus pilis glandulosis passim donatis, corollæ flavæ tubo brevi sat attenuato juxta medium paullo contracto basi aliquanto dilatato limbo subbilabiato lobo antico quam reliqui altius soluto lobis omnibus oblongo-obovatis obtusissimis, staminibus 2 exsertis 2 e filamento brevi et anthera parva subrotunda sistentibus staminodio minimo, ovario ovoideo sursum attenuato glabro, stylo puberulo, stigmatis lobis subconfluentibus, ovuli secundi rudimento minimo.

Folia 2·0–4·0 cm. long., 1·0–1·5 cm. lat., membranacea; costæ secundariæ utrinque 4, ascendenti-arcuatæ, utrinsecus parum eminentes; petioli lati., fac. sup. parum excavati, circa 0·3 cm. long. Inflorescentia circa 2·0 cm. long., corollis neglectis paullo ultra 1·0 cm. diam. Bracteæ 0·8–1·3 cm. long., superne 0·5 cm. lat., dorso carinatæ, longitrorsum 3–5-nervosæ. Bracteolæ ± 0·5 cm. long. Calycis lobi 1·0 cm. long., vel paullulum ultra. Corollæ tubus 1·1 cm. long., basi 0·35 cm., paullo supra medium 0·2 cm., faucibus 0·3 cm. diam.; lobus anticus 1·2 cm., lobi postici 0·8 cm. long., omnes circa 0·65 cm. lat. Filamenta stam. 2 ad 0·9 cm. supra basin corollæ tubi inserta, 1·6 cm. long.; antheræ 0·3 cm. long.; stam. 2 filamenta vix 0·1 cm. long., antheræ 0·08 × 0·07 cm.; staminodium 0·04 cm. long. Ovarium 0·4 cm., stylus 2.2 cm. long.

A distinct species, known by the short interpetiolar spines and the oblong-spathulate bracts, together with the small glandular calyx with its anticous lobe broader above and 2-toothed at the top.

Barleria (§ Acanthoidea) **jubata**, sp. nov.—Verisimiliter fruticulosa ramis validis crebro foliosis pilis simplicibus dense albopubescentibus, foliis parvis oblongis vel oblongo-obovatis apice obtusis vel obtusissimis ipso spinula rigida terminatis basi in

petiolum brevem paullo angustatis utrinque præsertim in nervis plus minus hispidulis subcoriaceis, cymis brevibus densis paucifloris ramulos abbreviatos albo-pubescentes coronantibus, bracteis bracteolisque linearibus rarius anguste lanceolato-linearibus apice longe spinoso-acuminatis margine spinis rigidiusculis patentibus indutis utrinque pubescentibus, calycis pubescentis lobo antico postico simili sed paullulum breviore ovato-oblongo apice integro margineque valide spinoso longitrorsum nervoso lobis lateralibus quam reliqui brevioribus lineari-lanceolatis acuminatis dorso pilis glandulosis simplicibus intermixtis onustis, corollæ mediocris verisimiliter cœruleæ tubo superne pubescente paullo supra basin leviter constricto sursum paullo dilatato faucibus angusto lobis inter se subæqualibus obovato-oblongis emarginatis juxta basin ciliatis, staminibus fertilibus breviter exsertis horum filamentis incrassatis deorsum pilosis, staminodiis 2 basi dilatatis et ciliatis antheris minimis cassis terminatis staminodio tertio reliquis simili sed anthera orbo, ovario ovoideo compresso glabro, stylo ima basi pubescente, stigmatis lobis subconfluentibus.

Folia 1·2–2·5 cm. long., 0·8–1·5 cm. lat., utrinsecus cystolithis admodum perspicuis ditissime donata, in sicco dilute viridia; petioli 0·25–0·5 cm. long., dense albo-pubescentes. Cymæ circa 2·5 × 2·5 cm. Bracteæ bracteolæque modice 1·8–2·5 cm. long., inferne plerumque 0·2 cm. lat., superne circa 0·1 cm.; harum spina terminalis circa 0·5 cm. long, spinæ laterales sæpissime 0·2–0·4 cm.; costa centralis fac. inf. valde prominens. Calycis lobi antici ægre 2·0 cm. long.; lobis posticus 2·3 cm., spinis lateralibus 0·2–0·4 cm. long. neglectis summum 0·7 cm. lat., ut antici pallidus et nervis utrobique perspicuis percursus; lobi laterales 1·3 cm. long., intus puberuli. Corollæ tubus 1·8 cm. long., ima basi 0·4 cm. paullo supra basin 0·3 cm., superne 0·45 cm. lat.; lobi circa 1·0 × 0·6–0·7 cm. Filamenta 2·0 cm. long., deorsum 0·1 cm. sursum 0·06 cm. lat.; antheræ 0·5 cm. long. Staminodia 0·35–0·4 cm. long. Discus 0·225 cm. alt. Ovarium nitens, 0·3 × 0·2 cm.; stylus fere 3·0 cm. long,

Undoubtedly nearest *B. elegans* S. Moore, but different in the dense pubescence, the small leaves, the narrow bracts and bracteoles, &c.

B. LANCIFOLIA T. And. in Journ. Linn. Soc. vii. 28.—This very rare plant, hitherto known only by a small scrap in the herbarium of Trinity College, Dublin, is the subject of a note in the *Journal of Botany*, 1902, p. 407. My satisfaction in lighting upon several good specimens undoubtedly referable to this species will readily be understood. The largest of these specimens is nearly 25 cm. long.; all of them agree excellently with Anderson's description and my own drawing made from the type, except that the corollas are not quite so wide at the throat (0·8 cm. instead of 1·0 cm.); one specimen, however, has a corolla apparently somewhat more advanced than the rest, and of the typical dimension.

MONECHMA GENISTIFOLIUM C. B. Cl. in Fl. Trop. Afr. v. 218.—This is a species restricted to the tropical part of German South-West Africa.

Monechma eremum, sp. nov.—Caule lignoso erecto sursum ramoso deorsum nudo, ramulis patule piloso-hirsutis foliosis, foliis brevipetiolatis linearibus vel anguste lineari-oblanceolatis obtusis utrinque minute pubescentibus firme membranaceis, floribus solitariis axillaribus sessilibus sæpissime ex ramulorum brevium axillis superioribus ortis, bracteolis quam calyx 4-merus leviter brevioribus spathulatis acutis ut calycis lobi anguste lineari-lanceolati acuti glanduloso-pubescentibus necnon margine ciliatis, corollæ calycem breviter excedentis tubo lato superne paullulum ampliato extus puberulo labio antico amplo breviter 3-lobo quam labium posticum ovatum retusum longiore, staminibus breviter exsertis antherarum loculis inter se subæqualibus inferiore calcare debili incurvo quam se ipsum breviore instructo, ovario anguste ovoideo apice piloso-puberulo, stylo superne piloso, ovulis pro loculo 2 quorum superiore casso, capsula anguste obovoidea obtusa basi compressa superne piloso-puberula 2-sperma.

Planta verisimiliter saltem bispithamea. Folia circa 1·0 cm. long. (raro 1·5 cm. æquantia), 0·3–0·4 cm. lat.; petioli 0·1–0·3 cm. long. Bracteolæ 0·5–0·6 cm. long. Calyx totus 0·6–0·7 cm. long.; lobi 0·45–0·55 cm. long. Corolla tota 1·0 cm. long.; tubus 0·5 cm. long.; basi 0·2 cm., faucibus 0.35 cm. diam. Labium anticum 0·5 × 0·7 cm.; lobus intermedius rotundatus, 0·175 × 0·3 cm.; lobi laterales oblongo-obovati, 0.2 cm. lat. Antherarum loculus sup. 0·075 cm. inf. 0·1 cm. long., hujus calcar 0·05 cm. long. Ovarium 0·12 cm. long.; stylus 0·45 cm. Capsula 0·6 cm. long., pars compressa asperma 0.2 cm. long. Semina subrotunda, levia, humectata paullo ultra 0·2 cm. diam.

Apparently nearest *M. Nepeta* C. B. Cl. (which is said in *Fl. Trop. Afr.* v. 219 to have five calyx-lobes, although there are only four), from which it can be told by means of the compact habit, the smaller and narrower leaves, larger corolla, longer capsule, &c.

Monechma platysepalum, sp. nov.—Caule lignoso folioso minute pubescente deinde fere glabro, foliis parvis subsessilibus oblongis utrobique obtusis (basi sæpe leviter rotundatis) fere a basi 5-nervibus firme membranaceis faciebus ambabus scabriusculis, floribus in spicis axillaribus admodum abbreviatis contiguis perpaucifloris dispositis, bracteolis spathulato-oblongis acutis quam calyx plane brevioribus, calycis glabri lobis 5 inter se fere æqualibus oblongo-ovatis apice breviter acuminatis ut bracteolæ medio viridibus ceterum decoloribus, corollæ tubo extus minute pubescente superne leviter dilatato, labio postico subquadrato apice truncato erosulo labii antici lobis lateralibus anguste obovato-oblongis lobo intermedio ovato omnibus retusis, staminibus exsertis antheris inter se æqualibus loculo inferiore calcare sibi ipsi æquilongo recto necnon obtuso instructo, ovario ovoideo sursum puberulo, stylo puberulo, ovulis quove in loculo 2 quorum uno crudo, capsula glabra inferne angustata et compressa superne ovoidea apice obtuse acuta 2-sperma.

Planta verisimiliter humilis (circiter ½-spithamea). Folia modica 1·5–2·0 cm. long., 0·6-0·7 cm. lat., in sicco lutescenti-viridia; petioli 0·1–0·2 cm. long. Spicæ corollis haud exemptis circa,

1·0 cm. long. Bracteolæ 0·4 × 0·13 cm. Calycis lobi imbricati, 0·55 cm. long., 0·2 cm. lat. Corollæ tubus intus passim piloso-pubescens, 0·6 cm. long., basi 0·2 cm. faucibus 0·3 cm. lat.; labium posticum vix 0·5 cm. long., basi 0·4 cm. lat.; labii antici lobi laterales 0·35 × 0·2 cm., lobus intermedius 0·35 × 0·3 cm. long.; palatus intrusus. Filamenta inferne pilosa, ægre 0·5 cm. long.; antherarum loculi 0·1 cm. long. Ovarium 0·175 × 0·1 cm., stylus 0·7 cm. long. Capsula in toto 1·1 cm. long., pars seminifera 0·5 cm. long.

A very distinct species, at once recognized amongst its allies by the short oblong obtuse leaves, together with the relatively broad bracteoles and calyx-lobes. It stands nearest to *M. hereroense* C. B. Cl. (*Justicia hereroensis* Engl.), a species not represented in this country, which, *inter alia*, has lanceolate sparsely pilose leaves, linear lanceolate bracteoles and calyx-lobes, and a considerably longer corolla, pilose outside.

M. NAMAENSE C. B. Cl. in Fl. Cap. v. pt. i. 73.—Now first admitted to the Tropical African Flora.

MEGALOCHLAMYS MARLOTHII Lindau in Engl. Bot. Jahrb. xxvi. 345, var. ?—If this be a correct determination, the specimens are depauperate ones, their leaves, for instance, being only half or one-third as large as those of the type. But the specimens are not good ones, and I think it safer to name them as above.

2. NOTE ON A SMALL COLLECTION FROM SOMALILAND.

Mr. G. W. Bury, whose collection is the subject of this note, botanized at Berbera and the Wagga Mountain. Among the *Gamopetalæ* is one species believed to be new, and there are a few rarities worthy of record.

RUBIACEÆ.

Pavetta Phillipsiæ S. Moore in Journ. Bot. 1899, 369. Berbera.

PLANTAGINEÆ.

Ceratostigma speciosum Prain in Journ. Bot. 1906, 8. Berbera.

SOLANACEÆ.

Solanum carense Dun. in DC. Prod. xiii. pt. i. 105. Wagga Mountain. (This species was also collected by Lord Delamere at Dadáro and Lé, alt. 3700 ft.)

ACANTHACEÆ.

Ruellia discifolia Oliv. in Hook. Ic. Pl. t. 1511. Berbera.

Barleria Hildebrandtii S. Moore in Journ. Bot. 1877, 69. Berbera.

Justicia diclipteroides Lindau in Engl. Bot. Jahrb. xx. 65. Wagga Mountain.

VERBENACEÆ.

Lantana concinna Bak. in Kew Bull. 1895, 223. Berbera.

LABIATÆ.

Orthosiphon gofensis S. Moore in Journ. Bot. 1901, 263. Wagga Mountain.

Orthosiphon (§ Virgati) **Buryi**, sp. nov. Ramis foliisque pube densa griseo-brunnea obductis, foliis manifeste petiolatis parvis ovatis obtusis apice induratis basi rotundatis leviter cordatis margine crenato-serratis, spicastris racemiformibus folia longe excedentibus piloso-pubescentibus, verticillastris circa 5-floris, bracteis parvulis oblongo-ovatis breviter acuminatis extus piloso-pubescentibus coloratis diu persistentibus, pedicellis gracilibus calyci subæquilongis cito decurvis piloso-pubescentibus, calycis parvi anguste campanularis piloso-puberuli intus calvi lobo postico ovato-rotundato acuto colorato lobis residuis lineari-lanceolatis lateralibus acutis quam antici acuminati paullulum brevioribus, corollæ parvæ pubescentis tubo calycem fere duplo excedente superne leviter amplificato labiis latis tubum plus quam semiæquantibus postico 4-lobo lobis breviter rotundatis, staminibus subinclusis, stigmate anguste clavellato.

Hab. Berbera, Somaliland; *G. W. Bury*. (Also at Kew, Somaliland, without exact locality; *Major Appleton*.)

Radix sat validus, circa 10·0 cm. long., sparsim fibrilliferus. Foliorum limbus ± 1·0 × 0.8 cm., firme membranaceus; hujus costæ fac. inf. prominentes; petioli 0·2–0·5 cm. long. Spicastrum nondum profecto evolutum 6·0 cm. long. Bracteæ ± 0·2 cm. long. Pedicelli 0·3–0·4 cm. long. Calyx florescens humectatus 0·5 cm. long., basi vix 0·2 cm. superne 0·3 cm. lat.; lobus posticus 0·2 × 0·2 cm.; lobi laterales 0·1 cm., antici 0·175 cm. long. Corollæ tubus 0·8 cm. long., basi 0·15 cm. superne 0·25 cm. lat.; labium anticum 0·5 × 0·4 cm., posticum 0·5 × 0·5 cm., hujus lobi circa 0·15 × 0·15 cm. Antheræ reniformes, 0·08 cm. lat.

Near *O. mollis* Bak., from which it differs in the comparatively long and slender pedicels, the calyx with longer teeth, the longer corolla, &c.

The two specimens seen are both of them scraps, and without fruiting calyces.

Leucas paucijuga Bak. Berbera.

(To be continued.)

TWO NEW JAPANESE POTAMOGETONS.

By Arthur Bennett.

I have long wished I could connect my friend Fryer's name with a plant of the genus he so well understands, but the hope of doing so with British or European specimens (except hybrids) seems remote. So I here give his name to a fine species from Japan that has remained without a name because of the want of material, for the reason that as time goes on greater caution is needed in multiplying species. I am now enabled to frame a description, Dr. Rendle having sent me an example to name from Nippon, and the Abbé Faurie a good specimen from Corea. It was gathered as long ago as 1863 by Maximovicz (Herb. Baagoe!), and has passed

under the name of *P. natans* L., as so many specimens of its nearest ally *P. amplifolius* Tuck. have in America. It has the extraordinary development of the stipules noticeable with the American plant; but the lower leaves are much less developed than in that species, although the plants are alike in facies.

Potamogeton Fryeri, sp. n. *Stems* simple (?), 0·5–1 m. long, stout. *Lower leaves* mostly lance-linear, variable, often folded and arcuate (as in *amplifolius*), 7-veined, the central one compound with elongate-areolation, with numerous cross-veins, the outer ones often branched. *Upper leaves* (floating) long petioled, 1–1½ dm. long, oblanceolate to elliptical, the blade decurrent on the petiole, without a joint, acute or subacute, 21–34-veined, connected by very numerous branched sub-veins, the whole surface of the leaf with irregular netted areolation. *Stipules* 5 cm.–1 dm. long, subacute, very strongly striated with numerous (31) veins with cancellate areolation between; even when the stipules are nearly decayed the thick frayed fibres are persistent. *Peduncles* 1–1·5 dm. ong, swelling upwards, but contracted at the base of the spike. *Spikes* 2 cm. long, dense-flowered, sepals (perianth-segments) orbicular. *Fruit* (not quite mature) 5 mm. long by 2·5 mm. broad, without teeth or bosses; ventral face straight, with a subacute style (1·5 cm. long) slightly curved to the dorsal face; dorsal face rounded, central keel (carina) prominently and sharply winged, the two outer keels slightly winged. *Embryo* semi-annular slightly constricted in the middle, very large, almost filling up the fruit with the exception of the style-base and fruit-base.

Habitat. Japan: Kiurchui, Nagasaki, May and June, 1863, *Maximovicz* in herb. Baagoe!; Shirkawa, July, 1877, *Faurie*, no. 28; Nippon in paludis Nambu, June, 1905, *Faurie*, no. 7184. Corea, in aquis Ouen-san, July, 1906, *Faurie*, no. 217.

Plant in appearance between *P. natans* L. and *P. amplifolius* Tuck., differing from *P. amplifolius* and *P. pulcher* Tuck. by the winged fruit, subacute ventral face, the embryo only semi-annular, and the much smaller lower leaves; and from all other species by the winged fruit and semi-annular embryo. When the wings are so developed it is a usual condition in the genus that they are crested or waved, but this is not so here. The stipules are remarkable for their stoutness and rigidity, with persistence of the fibrous parts; and the floating leaves for their structure, the netted areolation is very close and compact, making the leaf very strong.

The fruits are (so far as I know) very remarkable for the expanded wing of their dorsal face; this must develop very rapidly towards the maturing of the fruit, as in the earlier stages I can find no distinct appearance of it.

Potamogeton Franchetii, sp. n. Some time before his death Herr Baagoe, of Nævsted, Denmark, sent me a drawing and specimen of a *Potamogeton* which M. Franchet had named "*P. natans* L." I at once recognized it as one sent me by M. Faurie, of which there is a poor specimen in the Kew Herbarium. We agreed it should bear M. Franchet's name, and that Herr Baagoe should describe it;

but he died before he could carry out his intention, and I am informed that no description can be found among his MSS., so it remains for me to do so.

In facies *P. Franchetii* is like large examples of *polygonifolius*, and also like some flaccid forms of *P. natans*; but the fruit and structure, &c., of the leaves are quite different. It may occur in herbaria under the name of *natans* or *polygonifolius*.

Stems 9–12 in. high, with moderately stout stems. *Leaves* lanceolate to lanceolate-ovate, $1\frac{3}{4}$–$2\frac{1}{2}$ in. long × $\frac{3}{4}$–1 in. broad on petioles $2\frac{1}{2}$–$4\frac{1}{2}$ in. long, semi-coriaceous, without the joint at the base as in *natans* L. *Stipules* acute, 1–$1\frac{1}{2}$ in. long, semi-persistent. *Spikes* $1\frac{1}{2}$ in., on peduncles $2\frac{3}{4}$–3 in. long, slightly diminishing upwards. *Fruit* large (three times as large as in *polygonifolius*), $1\frac{3}{4}$ lin. long × $1\frac{1}{4}$ lin. broad. Ventral face slightly rounded, dorsal lunate, shouldered so that the apex is nearly level with the style, with a sinus between. Central carina slightly produced, with a semi-acute wing, laterals nearly obsolete, base of the fruit with two non-prominent bosses. Fruit oblique-obovate, semi-compressed.

Habitat. Japan: Yososka, in orizetis inundatus (Nippon), no. 1344, 1866–1871, *A. Franchet* (Dr. Ludv. Savatier, Plant. japon.); Hirmnushria, Mus-aski, July, 1899, *T. Makino*, Herb. Zurich (Dr. Schröter); *Dickson* (1881) (unlocalized), in Herb. Kew, no. 339.

NOTE ON *LYONSIA*.

By James Britten, F.L.S.

A comparison of the specimens of *Lyonsia* in the National Herbarium with Robert Brown's types and MSS. has led to the discovery that *L. straminea* of his *Prodromus* has been misunderstood by all recent writers, the name having been misapplied by them to a plant distinguished by F. von Mueller as *L. reticulata*.

When establishing the genus (in Mem. Wern. Soc. i. 66) Brown named no species, but in his *Prodromus* (p. 466) he added the name *L. straminea*, without description but with an indication of the localities where he had seen it growing. Alphonse De Candolle (Prodr. viii. 401), adopting Brown's species, gave a description of the plant drawn up from specimens communicated by Allan Cunningham.

In 1860 Mueller (*Plants of Expedition to R. Burdekin*, 16) distinguished a second Australian species, *L. reticulata*, which he described as having the "lobes of the corolla clothed inside entirely with retroversed hair," thus differing from his notion of *L. straminea*, of which he says "flowers bearded only distinctly at the faux"—a character which he shows clearly in his figure lettered *Lyonsia straminea* R. Br. (Ic. Pl. Vict. t. 58 (1864–5)). Bentham (Fl. Austral. iv. 321 (1869)) adopts Mueller's names for the two plants, adding to *L. reticulata* the note: "This species was confounded with *L. straminea* by R. Brown and others, but well distinguished by F. Mueller. A. De Candolle's description of *L. straminea* in

the *Prodromus* is taken from A. Cunningham's specimens of *L. reticulata*."

It is however evident from the material in the National Herbarium that Mueller was incorrect in his interpretation of Brown's *L. straminea*; this of course is not remarkable, seeing that, as has already been stated, Brown published no detailed description of the species; but it is strange that Bentham, who consulted Brown's specimens—and might have consulted his MSS., though I do not think he did so—should have adopted Mueller's determination, especially as he (Bentham) had observed that De Candolle's description referred, at any rate in part, to Mueller's *L. reticulata*. It is the specimens from Hunter's and Williams Rivers, which Bentham places under *reticulata*, that Brown himself has labelled "*Lyonsia straminea* Prodr. 466"—and it is these which he describes in his MSS. under that name. Moreover the very beautiful drawing by Ferdinand Bauer, named (doubtless on Brown's authority) *L. straminea*, is of the same plant, the characteristic clothing of the lobes of the corolla being admirably shown. An authentic specimen of Allan Cunningham's *L. straminea* also (as rightly understood by De Candolle) belongs here; and, if further confirmation be needed, it is furnished by the exact correspondence of all with specimens of Mueller's *L. reticulata* named by himself, collected by Beckler at Hastings River on the expedition to the estuary of the Burdekin.

On the other hand, Brown's specimens from Port Dalrymple, which Bentham accepts as his *L. straminea*, were never so named by Brown himself. The plant is separately described though not named in his MSS., and his label has "Lyonsia cfr. stramineam."

It is thus clear that the name *straminea* must stand for the plant to which it originally belonged, while that incorrectly so considered by Mueller and Bentham must receive a new name. I propose to call it *L. Brownii*, Brown having first recognized the two species. The two plants will stand as follows:—

LYONSIA STRAMINEA R. Br. Prodr. 466 (1810), MSS.! et herb.!; A.DC. Prodr. viii. 401 (1844); Ferd. Bauer, Ic. Austral. 100!
L. reticulata F. Muell. Pl. Exp. Burdekin, 16 (1860)! Benth. Fl. Austral. iv. 521 (1869); Bailey, Queensl. Fl. 989 (1900).

"Ad littora Newcastle Inlet and ad ripas fluv. Hunters Patersons et Williams Rivers, Nov. 1804"; R. Br. MSS. et Herb. no. 2866! (pro maxima parte); "Keppel Bay," R. Br. Herb. no. 2867!

L. BROWNII (nom. nov.).
L. straminea F. Muell. Pl. Exp. Burdekin, 16 (1860), Ic. Pl. Vict. t. 58 (1864–5); Bentham, Fl. Austral. iv. 321 (1869); non R. Br.

"Lyonsia cfr. stramineam. In Upper Island, Port Dalrymple, Jan. 1804." R. Br. MSS. et Herb. no. 2866 (pro parte)!

A NEW BRITISH MOSS (*FISSIDENS ALGARVICUS* Solms).

By H. N. Dixon, M.A., F.L.S.

In 1868 Graf zu Solms-Laubach described a new species of *Fissidens* gathered by himself two years earlier near Silves, a town of Algarvia, in the south of Portugal, under the name of *F. algarvicus*. Its specific rank is maintained by Schimper in the second edition of his *Synopsis*, and by most recent writers, but some subsequent authors have referred it as a variety severally to *F. pusillus* Wils. (Boulay) and *F. incurvus* Starke (Husnot). Mitten (Journ. Linn. Soc., Botany, xxi. 555), referring it to *F. viridulus* Hedw., states that it is the same as *F. intralimbatus* Ruthe, but gives no reasons for that assertion. (He refers to it as "*F. introlimbatus* Ruthe, Hedwigia, 1870, re-described by Schimper as *F. algarvicus* C. de Solms; but there are no specimens so named in his herbarium," apparently overlooking the fact that *F. algarvicus* was originally described by Solms-Laubach himself two years prior to Ruthe's publication of *F. introlimbatus*.) *F. Sardagnai* Vent. (Rev. Bry. 1883, 93) is also compared by its author with *F. algarvicus*, which, however, he considers clearly distinct. Finally, Limpricht (Laubmoose . . . iii. 671) says of *F. Orrii* (Lindb.) Braithw. (referred already by Mitten to his *F. tequendamensis*), "Vielleicht identisch mit *F. algarvicus* Solms."

One need have a pretty taste in Gordian knots to attack such a problem spontaneously, and for my part its solution might well have been left to our continental *confrères* in bryology, but for the recent discovery of *F. algarvicus* in Britain. Early this spring Mr. G. B. Savery sent me a few interesting mosses gathered by himself and his brother near Exeter, and among them was a small *Fissidens* growing on the red sandy shale of that neighbourhood, queried as *F. pusillus*. A careful examination showed that it was certainly *F. algarvicus* Solms, of which I possessed the specimen from Cherbourg, leg. Corbière, issued in the *Musci Galliæ*, No. 812; and I was subsequently able to compare it with an authentic specimen in the British Museum Herbarium from Solms-Laubach himself—an extremely meagre specimen, but sufficient to confirm the identity of our British plant, and rather curiously growing upon a similar deep red clayey soil. The question then arose as to the true position and relationships of *F. algarvicus*, as to which I must confine myself to a brief statement of the conclusions I have arrived at, without attempting to justify them with any degree of completeness.

F. algarvicus is, I am convinced, a good species, quite distinct from either *F. viridulus*, *F. incurvus*, or *F. pusillus*. The most obvious character, distinguishing it indeed from all our smaller species of *Fissidens*, is the gradually tapering, acuminate leaf-points. Other species, e. g. *F. pusillus*, often show a gradual narrowing of the leaves in the upper part, but the actual apex is always more or less abruptly pointed, or even subobtuse and apiculate; in *F. algarvicus* it tapers gradually to an acute acumen, giving a very

characteristic appearance to the plants, especially the sterile shoots. The leaves are extremely narrow. Another feature is the stout border, unusually stout indeed for the small size of the plant; not only is it of several cells in width, but it is actually thickened at times, as in the section Pachylomidium. This, however, only occurs in the best developed leaves, and does not perhaps altogether justify its inclusion in that section. It is this stout border which prevents the leaves from curling up when dry as do most of the smaller species; they are indeed in the dry state often very little altered. A third character is the comparatively lax areolation. Schimper, indeed, describes it, "reti tenui ut in *F. bryoide*," a somewhat inaccurate statement, which has, I believe, led to a good deal of the confused synonymy above referred to. In both Musci Gall. 812, and in Solms-Laubach's original plant, I find the cells—as in the Devonshire specimens—conspicuously laxer and more irregular than in *F. bryoides* and the other species to which *F. algarvicus* has at times been referred. Venturi's description of the cells of *F. Sardagnai* exactly describe it: "Areolatio foliorum ubique ex cellulis oblique et irregulariter hexagonis, laxior quam in *F. pusillo* et *incurvo*." In the vaginant lamina especially the cells are remarkably elongated, irregularly rhomboid-hexagonal and hexagono-rectangular; in fact, altogether different in character from the usual areolation in the species of this section. The dorsal lamina gradually narrows downwards and disappears above the leaf-base. The capsule is minute, erect, and symmetrical. For other details I must refer readers to the published descriptions.

The characters enumerated will, I think, serve both to indicate the marks by which the plant may be distinguished, and at the same time to establish its title to specific rank. A word or two must now be said as to its relationship to the species referred to at the commencement of this article.

F. intralimbatus Ruthe may for our purpose be dismissed at once; it belongs to quite a different section, having the vaginant lamina alone bordered. In all probability the somewhat misleading description of *F. algarvicus* given by Schimper, together with a similarity in the names of the localities where the two plants were found, induced Mitten's supposition. Both were indeed found during the same year in Algarvia by Graf zu Solms-Laubach; but while *F. algarvicus* was gathered near Silves, *F. intralimbatus* was found near Tavira, at least one hundred and twenty-five miles away.

Nor can there, I think, be much question that the characters of *F. algarvicus* are sufficiently well defined and important to preclude its subordination as a variety to any of the three species—*F. pusillus* Wils., *F. incurvus* Starke, and *F. viridulus* Wahl.—to which it has been at times referred. The form of the leaf apex, together with the strongly developed and even thickened border, and the areolation, remove it in my opinion further from any of these than they in their turn are separated from one another.

The resemblance of *F. algarvicus* to *F. Orrii* Braithw. (*Schistophyllum Orrii* Lindb. Rev. Bry. 1880, p. 97) at once struck me,

although at the time I knew the latter only from descriptions and from Braithwaite's figure. This resemblance I found had also occurred to Limpricht, as quoted above. *F. Orrii* is supposed to be an introduction from exotic regions, and was referred by Mitten to his South American *F. tequendamensis*, a species which I have not seen. The distribution of *F. algarvicus*, along the Atlantic from Portugal and Spain to Finisterre and the southern shores of England, would, indeed, favour Limpricht's suggestion. I am doubtful, however, if this identity can be maintained. I have examined the specimen of *F. Orrii* in the British Museum (Glasnevin, D. Orr, 1854, herb. S. O. Lindberg), and while the close similarity between this and *F. algarvicus* is undoubted, there are points of difference which can scarcely be neglected. The nerve in *F. Orrii* is much stouter than in *F. algarvicus*, and runs out into a firm stout mucro, as figured by Braithwaite; in *F. algarvicus* the nerve usually becomes more or less evanescent at apex, and the cuspidate point is formed almost entirely by the confluent borders of the leaf. In consequence of the stoutness of the nerve, the leaves are still more rigid, and when dry less altered than in *F. algarvicus*. The capsule also in *F. Orrii* is inclined and curved. I do not feel justified, therefore, in considering *F. Orrii* identical with *F. algarvicus*, although I think it quite probable that the examination of a wider range of material might show that the above characters were less constant than they now appear, and the differences therefore less important. I am the more prepared to expect this because I find the areolation in *F. Orrii* quite similar to that of *F. algarvicus*, especially in the unusually lax and elongated cells of the vaginant lamina.

On the other hand, *F. Sardagnai* Vent. is, I am convinced, identical with *F. algarvicus*. Although I have not seen specimens of *F. Sardagnai*, the description given by Venturi is sufficiently detailed to justify an opinion being formed. The size of the spores (in *F. algarvicus* 11–14 μ, in *F. Sardagnai* 15–20 μ) and their sculpturing are the chief separating characters mentioned by Venturi. The difference in size is not, however, of any importance, for, apart from the fact that a similar range of size is found in other species of *Fissidens* (*e. g.* in *F. pusillus* the spore measurements, as given by Roth, are 8–12 μ or 10–14 μ, while its var. *irriguus* Limpr. has them 14–18 μ), the range in *F. algarvicus* is much greater than as described by Venturi. In two gatherings by Mr. Savery I find them range from 13–18 μ, and from 14–22 μ respectively. As regards their sculpturing, Venturi describes the spores of *F. Sardagnai* as "leniter sed grosse papillosæ"; in *F. algarvicus* they are smooth or almost so: but it is somewhat difficult to weigh the value of this distinction without having compared specimens. The description by Venturi of *F. Sardagnai* applies as a whole in almost every respect to *F. algarvicus*; the form of leaf, the incrassate border—on which he lays great stress—the lax areolation, all exactly agree. He compares his species with *F. algarvicus*, which, however, it is clear he only knew from the descriptions, basing the distinction on the size and sculpturing of the spores,

the leaves narrower in *F. Sardagnai*—but this is a very variable character in *F. algarvicus*—and their rigid condition when dry, which, however, as already mentioned, is characteristic of *F. algarvicus* also. Finally, he refers to the difference in areolation, but this distinction is based on Schimper's comparison of the cells of *F. algarvicus* with those of *F. bryoides*, which, as I have stated, is incorrect. There is, therefore, nothing to separate them but the sculpturing of the spores described by Venturi, and without wishing to detract from the value of this character, I do not think, at the best, it is a sufficient one on which to base a specific difference.

The synonymy would therefore stand thus:—

FISSIDENS ALGARVICUS Solms, Tentam. Bryol. geograph. Algarviæ, p. 41 (1868).
F. Sardagnai Vent. Rev. Bry. 1883, p. 93.
F. incurvus var. *algarvicus* Husn. Fl. de N. O. p. 54 (1882).
F. pusillus var. *algarvicus* Boul. Musc. France, p. 529 (1884).

I desire to express my obligation for assistance to Mr. A. Gepp, Miss A. L. Smith, and Dr. G. Roth.

CEPHALANTHERA LONGIFOLIA FRITSCH.

ASSUMING that the generic names *Cephalanthera* and *Epipactis* are to be retained (see p. 105), another name must replace that of *C. longifolia* Fritsch, which is chosen in the *List of British Seed-plants* for *C. ensifolia*. In the *Abridgement of the Gardeners Dictionary* (1771) Miller describes, under the ill-chosen name of *Serapias latifolium* (no. 4), a plant which is undoubtedly *C. ensifolia*; he alludes to the "spear-shaped leaves," and "the loose spike of white flowers," and localizes it "Hertfordshire," from which county it was first reported by Eales in Gibson's *Camden* of 1695 (*teste Flora Herts*). Therefore I contend *Cephalanthera latifolia* (Miller) must replace *C. longifolia* Fritsch. I have not been able to consult the eighth edition of Miller's *Gardeners Dictionary* of 1768, where probably the name will also be found, but the *Abridgement* precedes by a year Scopoli's *Flora Carniolica*, where he names *Serapias longifolia*.

G. CLARIDGE DRUCE.

When Mr. Druce sent us the foregoing note for publication, we pointed out to him the grounds on which the name he suggests is untenable, in the hope that we might avert the printing of one more useless synonym. Unfortunately, however, Mr. Druce's well-known (and to our mind regrettable) enthusiasm for new combinations had forestalled us, and the name appears in a "list of desiderata"—surely an improper place for such publication?—in the *Report of the Botanical Exchange Club* for 1906, issued in April last. This being so, it seems necessary to prevent, as far as possible, its further circulation, by demonstrating its inaccuracy.

S. latifolium first appears in Miller's *Gardeners Dictionary* ed. 8, with the diagnosis "bulbis fibrosis, nectari labio quinquefido clauso, foliis lanceolatis nervosis amplexicaulibus," followed by the synonym "Helleborine latifolia, flore albo clauso. Raii Syn. [ed.] 2, 242," and the locality "discovered first in Hertfordshire."* In his English description Miller, as Mr. Druce points out, refers to the "spear-shaped veined leaves" and the "loose spike of white flowers"; this, with the absence of any reference to *ensifolia*, probably led him to the conclusion that that plant was intended. Against these, however, must be set the "flore albo clauso" of Ray and the "shut" flower of Miller, and the latter's remark—"There are some other species of this genus which grow naturally in Great Britain and Ireland, but as I have not had the good fortune to meet with them, I shall not trouble the reader with an imperfect account of them from books." It is practically certain that *ensifolia* was known to Miller by description, for that plant stands in Ray next to his "Helleborine latifolia flore albo clauso," as "H. foliis prælongis angustis acutis"—an admirable descriptive phrase, unmistakeably characterizing a plant which under no circumstances could accurately be called *latifolia*.

A further difficulty is suggested by the locality, for *C. ensifolia* is not known to be a Hertfordshire plant. It was first recorded as such in R. Syn. ed. 2, 242: "eandem nuper accepi a D. Eales in Hartfordia inventam"; this is quoted in the *Flora Hertfordiensis* (where, by the way, the Diggeswell plant is rightly referred to *C. grandiflora*), and another locality, "Handpost farm, Hemel Hempstead," is given on the authority of a Mr. Hamilton, but is stated to require confirmation, which it never received. The entry "Herts" in *Top. Bot.* is, as Watson's MSS. show, based only on *Fl. Hertf.* In the *Flora of Hertfordshire* these two records are combined in an extraordinary manner,—thus: "Handpost Farm, Hemel Hempstead; *Eales, Gibson's Camden*, 326"; and it is stated that search for the plant proved vain, though *Ophrys muscifera* had been found in the locality.

What, then, was *Serapias latifolia* Mill.? This can hardly be doubtful. In R. Syn. ed. 3, 384, the words "eadem cum priore" [*C. grandiflora*] are added to the description of "H. latifolia flore albo clauso," and it would seem that Mr. Druce himself has until now accepted that verdict, for in his identification of the plants of the *Synopsis* (see *The Dillenian Herbaria*, p. 115) he passes this by without comment, rightly assigning the name *ensifolia* to "H. foliis prælongis angustis acutis." Any doubt on the matter, however, is finally set at rest by Miller's own specimens, bearing his description in his own hand: these specimens, which we did not see until most of the foregoing note had been written, are unmistakeably *C. grandiflora*, under which they are correctly placed in the National Herbarium.

ED. JOURN. BOT.

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* The reference is to R. Syn. ed. 2, 242; "Found by Dr. Eales near Digges-Well in Hartfordshire."

DONAX AND *SCHUMANNIANTHUS*.

By R. A. Rolfe, A.L.S.

When publishing his Monograph of the *Marantaceæ* in 1902 (*Das Pflanzenreich*, iv. 48), Schumann had not seen a Philippine example of his therein-established genus *Actoplanes*:—"Findet sich nicht auf den Philippinen (sehr viele Sammler)," (p. 34). One of the species, however, does occur in the Philippines, and as its history has been somewhat confused it seems desirable to place upon record the facts discovered in comparing some material from that country.

Blanco, in 1837, enumerated *Maranta arundinacea* L. as a native of the Philippines, though he had some doubt about its identity, and remarked: "Será mas bien la especie *Tonxat*?"

Naves, in 1880, enumerated four Philippine species of *Maranta*, *M. dichotoma* Wall., *M. grandis* Miq., *M. arundinacea* L., and *M. ramosissima* Wall. The first and last are synonymous, and represent *Donax Arundastrum* K. Schum. (but not the original of Loureiro), a species which I have not seen from the Philippines; the third appears to have been correctly determined, but is not indigenous in the Philippines; while the second, which Naves suggested was rather a variety of the first, represents the plant enumerated by Blanco, though it is different from Miquel's plant of the same name. It is well figured by Naves under the name "*Maranta dichotoma* L.-Blanco = ? *Phrynium dichotomum* Roxb." It has since been enumerated as *Clinogyne grandis* Benth. et Hook. f., which arose from Bentham's identification of the Philippine with the Sumatran plant, which proves to be erroneous.

Schumann, who pointed out that there were two species of *Actoplanes*, an eastern and a western, had apparently not seen a Sumatran example, and referred *Maranta grandis* Miq. to the eastern *A. canniformis* K. Schum., but authentic specimens at Kew show that it belongs to the western plant, which he called *A. Ridleyi*.

This discovery necessitates a rearrangement of the synonymy, but there is a further complication in the generic name. The identity of *Donax Arundastrum* Lour. has long been the subject of speculation. Gagnepain has pointed out that Schumann's identification of *Phrynium dichotomum* Roxb. with Loureiro's plant was probably erroneous, as the latter's description of the fruit agrees with *Actoplanes*, and his inclusion of *Arundastrum vel Tonchat Seytan* Rumph. as a synonym of *Donax* is cited as confirmatory evidence. Gagnepain further redescribes *Donax Arundastrum* K. Schum. (non Lour.) under the name of *Schumannianthus dichotomus* Gagnep. A comparison of Loureiro's type at the British Museum (which Gagnepain had not seen) confirms the view that *Donax* Lour. and *Actoplanes* K. Schum. are identical.

It is fortunate that the last element of doubt about the genus can be removed; all that now remains is to restate the synonymy of the species, for Gagnepain refers all to *Donax Arundastrum* Lour.,

though briefly mentioning *Actoplanes Ridleyi* K. Schum. as a second species. He also speaks with great doubt about the inclusion of *Thalia cannæformis* Forst., but the type of that is also preserved at the British Museum, so that its position is not uncertain. It may be added that there is a fine original drawing of Roxburgh's *Phrynium dichotomum* preserved at Kew, with one of the allied *P. virgatum* Roxb.

The following is the revised synonymy :—

1. Donax Arundastrum Lour. Fl. Cochinch. p. 11 (1790) (excl. syn. Rumph.) ; Gagnep. in Bull. Soc. Bot. Fr. li. p. 177 (partim).
   Thalia cannæformis Banks in Syme's Embassy to Ava, i. p. 473 (1800), cum tab. ; ed. 2, iii. p. 305, t. 21 (non Forst. f.).
   Maranta grandis Miq. Fl. Ind. Bat. Suppl. p. 616 (1860).
   Phrynium dichotomum Koern. in Bull. Soc. Imp. Nat. Mosc. xxxv. pt. i. p. 104 (1862) (partim).
   Clinogyne grandis Benth. et Hook. f. Gen. Plant. iii. p. 651 (1883) (excl. syn. Koern.) ; Baker in Hook. f. Fl. Brit. Ind. vi. p. 258 (partim).
   Donax grandis Ridl. in Journ. As. Soc. Straits, xxxii. p. 176 (1899) (excl. exempl. Born.).
   Actoplanes Ridleyi K. Schum. in Engl. Pflanzenreich, Maraut. p. 35 (1902) (excl. exempl. Born.).
   A. canniformis K. Schum. *l. c.* p. 34 (partim).
2. D. cannæformis Rolfe, comb. nov.
   Thalia cannæformis Forst. f. Prodr. p. 1 (1786) ; Willd. Sp. Pl. i. p. 16 (1797).
   Ilythuria cannæformis Raf. Fl. Tellur. iv. p. 51 (1836).
   Maranta Tonchat Willd. Sp. Pl. i. p. 13 (1797) partim (non Aubl.) ; Blume, Enum. Pl. Jav. p. 36 (1827).
   M. arundinacea Blanco, Fl. Filip. ed. 1, p. 7 (1837) (non Linn.) ; ed. 2, p. 5 ; ed. 3, i. p. 9, t. 5.
   Phrynium canniforme Koern. in Regel Gartenfl. vii. p. 85 (1858).
   P. dichotomum Koern. in Bull. Soc. Imp. Nat. Mosc. xxxv. pt. i. p. 104 (1862) (partim).
   Maranta dichotoma Naves in Blanco, Fl. Filip. ed. 3, Nov. Appx. p. 228 (1880) (non Wall.).
   M. grandis Naves, *l. c.* (non Miq.).
   M. ramosissima Naves, *l. c.* (non Wall.).
   Clinogyne grandis Vidal, Phan. Cuming. Philipp. pp. 4, 152 (1885) (non Benth. et Hook. f.) ; Vidal, Pl. Vasc. Filip. pp. 275, 399 (1886) ; K. Schum. et Lauterb. Fl. Deutsch. Schutzg. Südsee, p. 236.
   Actoplanes canniformis K. Schum. in Engl. Pflanzenreich, Marant. p. 34 (1902) (partim).
   Arundastrum vel Tonchat Seytan. Rumph. Herb. Amb. iv. p. 22, t. 7 (1750).

Both the species appear to be common and widely diffused in their respective areas, and observation in the field may throw further light upon their geographic limits. At present, however,

D. Arundastrum appears to extend from Sumatra westward to Singapore, Malacca, Perak, Pahang, Rangoon, and the Andaman Islands; and *D. cannæformis* from Java, Borneo, and the Philippines, eastward to New Guinea, the Aru Islands, Admiralty Islands, Solomon Islands, and the New Hebrides. *D. cannæformis* is very common in the Philippines, being found in Mindanao, Palauan, Mindoro, Culion, and in numerous provinces in Luzon.

The foregoing have been so completely confused with *Phrynium dichotomum* Roxb., now referred to *Schumannianthus* Gagnep., that a revision of the synonymy of this genus also seems desirable:—

1. SCHUMANNIANTHUS DICHOTOMUS Gagnep. in Bull. Soc. Bot. Fr. li. p. 176 (1904) (excl. exempl. Philipp.).

Phrynium dichotomum Roxb. Asiat. Research, xi. p. 324 (1810) (excl. syn.); Koern. in Nouv. Mém. Soc. Imp. Nat. Mosc. xi. p. 350, t. 8, 9; et in Bull. Soc. Imp. Nat. Mosc. xxxv. pt. i. p. 104 (partim); Horan. Mon. Scit. p. 11 (partim).

Clinogyne dichotoma Salisb. Trans. Hort. Soc. i. p. 276 (1812); Baker in Hook. f. Fl. Brit. Ind. vi. p. 258 (partim).

Thalia dealbata Link in Jahrb. Gewachsk. i. pt. 3, p. 21 (1820) (non Fraser).

T. dichotoma Willd. ex Link, *l. c.*

Maranta dichotoma Wall. Cat. n. 6614 (1828).

M. ramosissima Wall. *l. c.* n. 6615; et in Pl. Asiat. Rar. iii. p. 51, t. 286.

Donax Arundastrum K. Schum. in Engl. Pflanzenreich, Marant. p. 33 (1902) (partim).

Gagnepain cites Cuming, 495, from the Philippines, as this species, but the specimens belong to *Donax cannæformis*.

2. S. VIRGATUS Rolfe, comb. nov.

Phrynium virgatum Roxb. Asiat. Research. xi. p. 324 (1810); Fl. Ind. i. p. 4.

Maranta paniculata Moon, Cat. p. 1 (1824).

M. virgata Wall. Cat. n. 6616 (1828); A. Dietr. Sp. Pl. i. p. 21; Wight, Ic. vi. p. 17, t. 2015; Thw. Enum. Pl. Zeyl. p. 320.

Clinogyne virgata Benth. et Hook. f. Gen. Plant. iii. p. 651 (1883); Baker in Hook. f. Fl. Brit. Ind. vi. p. 258; Hook. f. in Trim. Handb. Fl. Ceyl. iv. p. 262.

Donax virgata K. Schum. in Engl. Pflanzenreich, Marant. p. 33 (1902).

A POINT IN NOMENCLATURE.

By JAMES BRITTEN, F.L.S.

ATTENTION should, I think, be drawn to a departure from ordinary practice in nomenclature—a departure which, though not new, appears to be on the increase, and which would seem to invalidate the principle of binominal nomenclature, already endangered by the American method of combining the varietal name with that of the species. An example will show more clearly and

more briefly than any description the practice against which, it is suggested, some stand or protest should be made. It does not seem to be explicitly condemned in the Vienna Rules, although Article 26 excludes it by implication.

Mr. Burkill's recent paper "On *Swertia angustifolia* Ham. and its Allies" (Journ. Asiat. Soc. Bengal, ii. no. 8, pp. 363–381, Aug. 1906) "is written to clear up a troublesome group in advance of an enumeration of all the species of Asia and a discussion regarding their distribution." Mr. Burkill has examined a vast mass of material, and the botany of his paper may be accepted as satisfactory: it is his nomenclature which is open to criticism.

In the first place, however, it is desirable to correct a misapprehension under which Mr. Burkill seems to labour with reference to Hamilton's * plants. It does not appear that the specimens sent by Hamilton to Lambert were "duplicate"; David Don describes them as "part of the fine collection of specimens made during his residence in Nepal, in 1802–3." † They were at any rate the types of the *Prodromus Floræ Nepalensis*: Don in his preface, having referred to Hamilton as one "qui plures plantas detexit novas, et in herbarium siccatas collegit," continues: "Harum maxima pars extat nunc in Museo cl. Aylmer Bourke Lambert, ima cum notis sagacissimis et nominibus apud incolas vernaculis, propria manu cl. D. Hamilton scriptis. Omnes attenté observavi in Museo Lambertiano; earumque descriptiones et methodica dispositio præciquam hujus opusculi partem constituunt." In the catalogue of Lambert's sale is the entry: "This Herbarium of Hamilton's supplied the materials for Prof. D. Don's Flora of Nepaul"; it was purchased for the British Museum for £9, and contained—according to a MS. note by Mr. J. J. Bennett, who incorporated it with the National Herbarium—"340 plants noticed in Prodr. Fl. Nepal. [these he indicated by 'ticks' in the margin of our copy of that work]; 105 Nepal plants not in that work; 127 Indian plants (excl. Nepal)."

Mr. Burkill does not seem to have recognized that the National Herbarium contains the type of *S. angustifolia*; he quotes the name *angustifolia* as of "Hamilton ex D. Don," and does not cite Hamilton's specimen as one that he has seen, although it is in the National Herbarium named and localized by Hamilton himself. ‡ He is probably right in supposing that Don had not seen a type of Hamilton's *S. pulchella*, but Mr. Burkill himself must have done so (though apparently without recognizing it) when he went through our herbarium, where we have a specimen so named collected by Hamilton in Mysore.

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* Mr. Burkill says "Francis Hamilton (afterwards Buchanan-Hamilton)," having overlooked Colonel Prain's clear demonstration that the combination of names is "erroneous and unnecessary" (Ann. Bot. Gard. Calc. x. 2, lxxv.).

† Lambert, *Pinus*, ii., Appendix 16.

‡ I note that Mr. Burkill, following the *Index Fl. Sinensis*, cites "Hance, 7561!" But the number of Hance's specimens in his herbarium—that cited by himself when establishing his *Ophelia vacillans* (now referred to *S. angustifolia*)—is 11387.

There can be no doubt that Hamilton's *Swertia angustifolia*, as represented by his specimen, is the type of the species, for that specimen was the only material which Don had before him when he drew up his description of the species. Mr. Burkill retains the name, but—and this is the main point of these remarks—he places under it a vast synonymy. In his clavis the species has no diagnosis except "leaves linear-lanceolate" separating it from *S. nervosa*, all other characters being divided among various varieties, the third of which is named "var. *Hamiltoniana* Burkill (*S. angustifolia* Ham.)." Moreover, the specimens examined are in like manner divided among the varieties, the aggregate species being thus left destitute of description or locality. For all practical purposes, therefore, it is in this case impossible to cite a "binomial or binary name" for any individual plant belonging to the species; and the plant named by Hamilton himself *S. angustifolia* (and the type of the species) must be referred to as "*S. angustifolia* Ham. var. *Hamiltoniana* Burkill"!

I am of course aware that it would be easy to cite precedents for this method of treating a species: Linnæus's *Ophrys insectifera* and *Valeriana Locusta* are instances, but in these cases the specific name has been generally abandoned, and this is in accordance with Article 51, no. 4, of the Vienna Rules. Dr. Hackel in his monograph of *Andropogoneæ* and elsewhere divides his larger species into varieties, of which the first is always styled *α genuinus* and is thus apparently intended to be regarded as the typical form; but here, as in the case of Mr. Burkill's Swertias, it does not seem possible to cite the binomial alone for any specimen. Other instances might easily be cited; my object is not, however, to multiply instances, but to call attention to the inconveniences which must arise if this method of nomenclature should become common. It is to be regretted that the matter was not discussed at Vienna, but this and other matters will doubtless receive attention when the Congress meets again in 1910.

BIBLIOGRAPHICAL NOTES.

XLII.—Robert Brown's 'Prodromus.'

Mr. J. H. Maiden, of the Botanical Gardens, Sydney, wrote to me lately asking me to investigate the truth of the tradition that Robert Brown had withdrawn his *Prodromus* from sale on account of a criticism which it had received, on the score of its Latinity, in a Review. This tradition, which in the form communicated to me by Mr. Carruthers will be found in this Journal for 1903, p. 252, is embodied in a remark by Martius in his *éloge* of Brown; of this a translation by Henfrey appeared in the *Annals and Magazine of Natural History*, 3rd Series, iii. 321–331 (May, 1859), which runs thus:—

"While scientific men called this work a *liber aureus*, and accepted it with unmixed praise, as marking a new epoch, a critic

in the Edinburgh Review found fault with its Latinity, and the author withdrew it from circulation."

To this statement Henfrey appends the following footnote:—

"The statement here repeated by our excellent author, although frequently made during Mr. Brown's life, and vouched for by high authority, is, we have reason to believe, founded in error. The original edition of the 'Prodromus' remained for many years in the hands of the publishers; and the remaining copies were at last withdrawn from sale only because Mr. Brown was desirous of keeping them in reserve to be given as presents to those botanists to whom he thought they might be most useful."

In order to set the matter at rest, so far as the supposed criticism went, Mr. Daydon Jackson has examined not only the *Edinburgh* but the other Reviews of the period, and has found no notice of the *Prodromus* in any of them.

The real reason for the non-continuance of the *Prodromus* seems to be that given by Francis Buchanan (once Hamilton) in two of the letters included by Colonel Prain in his very interesting sketch of the life of that botanist issued in 1905, of which I hope to give some account later. Writing to Wallich in 1817, from Callander, Buchanan says that "in this country" there is not "at present any encouragement for works on natural history, so that the first volume of Browne's [*sic*] Prodromus Floræ Novæ Hollandiæ, a most scientific work, finding no sale whatever, he has stopt short." Again in 1821 Buchanan writes: "Brown's work on the plants of N. Holland, one of the most scientific that has of late appeared, would not sell in London, and he was so mortified that I believe he will publish no more of his Prospectus [Prodromus]."

Sir Joseph Hooker, commenting on the statements of Martius and Henfrey, says: "In 1856 Mr. Brown informed me that the *Prodromus* was printed by himself, costing him about £100, and that after about 26 copies were sold at 18s. each, he recalled all the remaining copies. I made a note of this at the time, and inserted it in a copy which he gave me in 1839."

So much interest attaches to everything connected with this "liber aureus," to adopt Martius's phrase, that the following particulars, from a memorandum in Brown's hand in the copy of the *Prodromus* in use in the National Herbarium may be worth printing. It would appear that the book was published early in 1810, but the date is not stated. The cost of printing 250 copies was £93 14s. 4½d.; "advertizing in Morning Post and Chronicle" cost 12s., on the covers of the *Botanical Magazine* and *English Botany* a guinea each. Twenty copies were delivered in March "to Miles and Hunter formerly Johnson & Co. [whose names appear on the title-page], St. Paul's Churchyard." Nine copies were "sent to Paris to Jussieu, Desfontaines, Labillardière, Correa, Richard, Beauvois, Bonpland, Du Petit Thouars, Leschenault"; sixteen were "presented to Sir J. Banks, Mr. Dryander, Dr. Smith, Mr. Turner, Mr. Lambert, Dickson, Aiton, Ferdinand Bauer, Francis Bauer, Koenig, Linnean Society, Mr. McLeay; Mr. Law of Edinburgh, Wernerian Professor, Trinity College, Dublin, Mr.

Caley." The entry of sales is very brief: single copies were sold at 18s. each on May 11 to "Mr. M."; May 24 to Mr. Woodward and Sir Thomas Cullum; on July 6 to Mr. Spence.

JAMES BRITTEN.

SHORT NOTES.

BRITISH RUBI.—It may be useful to supplement Mr. Moyle Rogers's general criticism of Dr. Gilbert's position (pp. 210, 211) by a few particular examples.—*R. fissus* Lindl. This cannot be *suberectus* × *cæsius*, being abundant in some districts in Scotland from which *R. cæsius* is absent. The *fissus* which I have seen sparingly in Berks and E. Kent is not quite like the typical northern plant, but comes nearer to *R. suberectus*.—*R. Rogersii* Linton. This, again, is certainly not *affinis* × *nitidus*. The Scottish counties in which it is most plentiful produce neither of the suggested parents; and it has no close connection with true *R. affinis*. —*R. holerythros* Focke and *R. rhombifolius* Weihe are suggested to be "both hybrids of *affinis* with the same or different Rhamnifolians." Now, in the heath-country between Godalming and Haslemere, Surrey, *holerythros* is locally abundant, and produces plenty of large, fine fruit (in my experience, the numerous bramble-hybrids are at least partially sterile); *rhombifolius* also occurs in some scattered spots, at a long distance from the one very limited station known to me thereabouts for *affinis*. Under such circumstances, the hybrid theory mentioned above is clearly untenable; moreover, it does not agree with the characters of *holerythros* and *rhombifolius* as a whole.—The main lesson which I draw from Dr. Gilbert's paper is that it is dangerous for "local botanists" to generalize too confidently from the special phenomena of their own neighbourhood, without due regard to wider researches.—EDWARD S. MARSHALL.

IRISH PLANTS.—In the *Irish Naturalist* for April Mr. Druce has some interesting notes on plants observed during his visit to Ireland last autumn. Of *Sisyrinchium californicum*, described and figured in this Journal for 1896, pp. 366, 494, Mr. Druce writes:— "In the locality where the Rev. E. S. Marshall discovered it at Rosslare, in the greatest abundance over many acres. It must be remembered that a few miles south of the station for this Western American species is Carnsore Point, on which, as my driver said, there had been more wrecks than almost any point in Ireland. It is easy, therefore, to imagine a wreck of Indian corn, as in the case of the *Polygonum sagittatum*, drifting on the coast at or near Rosslare, and in this manner bringing the seeds of the Californian species. The plant seeds very freely, and one could not walk about amongst it without scattering the seeds. Moreover, I examined several pads of earth which had been scattered from the feet of horses, and in each case saw seeds adhering, so that the animals grazing in the meadows would assist to distribute it when once established. Moreover, the locality is subject to floods, and these would also assist in its dispersal. The fact remains that the plant

is completely established, but I have no doubt in my own mind that to some wreckage containing Californian produce we must attribute the occurrence of this Western American species in Ireland." The note on *Polygonum sagittatum*, which Mr. Druce found abundantly in the Kerry locality recorded in *Cybele Hibernica*, shows how local names may originate : "By a piece of good luck I am able to throw some light on its method of introduction to the Irish flora. On my return from Derrynane, I gave a lift on my car to a man who, seeing my vasculum full of this plant, said, 'You have Dada's Weed.' I asked him what he meant by using that name. He replied by telling me that about fifty years ago a boat with a load of Indian corn was wrecked on the coast near Castle Cove. The corn was obtained by the man's father-in-law, who had a mill about a mile or so up the small stream. The corn was duly ground into meal, but the next year the Polygonum began to appear, and spread rapidly, so that in time it was called by the children 'Dada's Weed.' I may say it is not easy to see any trace of the mill, which has been long ago demolished. Doubtless the prickly stems led to its being conveyed by animals into the neighbouring bog, while the stream itself carried the plant, or the seed of it, downwards to its outfall into the sea. Had the course been longer, a greater extent of the country would have been occupied by this invader." Mr. Druce's paper also includes the description of a new variety of *Agrostis canina* var. *lævis* Hackel *in litt.*—"'Differt a typo foliis omnibus planis latiusculis (circ. 2mm. latis) prorsus lævibus, paniculæ ramis spicularumque pedicellis lævibus, spiculis majusculis.' This grew near the summit of Brandon, and at once attracted my attention, reminding me somewhat of the variety *scotica*, which I gathered on Ben Eay, in Scotland, but I found differed from it in several particulars. Professor Hackel therefore names it as a new variety."

NOTICES OF BOOKS.

Some Introductions.

Introduction to Plant Ecology. By the Rev. G. Henslow, M.A., F.L.S. Small 8vo, cloth, pp. x, 130. Price 2s. Stanford.

Wild Flowers in Their Seasons. By F. Edward Hulme, F.L.S., F.S.A. With 80 coloured plates. Pott 8vo, leather, pp. x, 263. Price 5s. net. Cassell & Co.

How to Study Wild Flowers. By George Henslow, M.A., F.L.S., F.G.S. With coloured plates and other illustrations. Third impression. 8vo, cloth, pp. 225. Price 2s. 6d. Religious Tract Society.

Mr. Henslow's object in writing his *Introduction to Plant Ecology* is to introduce the subject to teachers of botany in schools. In the earlier chapters, which are addressed more especially to

teachers, the author insists on the educational value of ecology, or "the study of plants in their native homes," as an out-of-doors object-lesson. As an introduction he takes an imaginary class out for a walk, and calls the attention of the students to the different points of interest in connection with the soil and the plant-life supported by it which arise during the walk. Ecology is in this sense indistinguishable from the "nature-study" which has come to the fore in recent years.

In discussing the value of morphology and classification in ecology in chapter iv., the author wisely insists on the importance of morphology as the basis of ecology, and strongly recommends the teacher to utilize classification as well as morphology "for sound educational purposes; since it is in the processes of weighing characters between different species, &c., that the elements of thought and judgement come into play." In another chapter (v.) Mr. Henslow complains that laboratory work is treated too independently; if the study of plant-life in nature is the ultimate object of the student, experimental and laboratory work ought to be directed to this end. The experiments in a well-known elementary work on practical physiology of plants are adversely criticised from this point of view, as also are other instances of modern methods of teaching botany.

The larger portion of the volume is devoted to a general account of the various plant-associations which are regarded as examples of the direct response of the plant to environment, and a chapter on floral ecology is introduced in which the view taken by the author in his book on the *Origin of Floral Structures* is maintained—the characters of the flower, form, size, scent, relative position and shape of parts being regarded as the direct results of the responsive action of the flower to the stimulating influence of the agent of pollination.

Mr. Henslow's little book will serve to give an idea of the methods of serious nature-study from the botanical side, though it necessarily leaves untouched the elaborate methods of the more advanced ecological school.

"This floral chronology by the author of those delightful volumes, 'Familiar Wild Flowers,' is the outcome of observations extending over a long duration of time, and conducted under the most favourable circumstances. Such a book will supply a very useful guide to the Nature-lover of botanical tastes. It is evident that if one would seek any particular plant by some more effective method than the hope of stumbling upon it some day by a happy chance, the when and the where of it should be considered, since they will be most potent factors. When we know the season a plant naturally appears [*sic*], and when we know the locality where we may reasonably expect to find it, we are far on our road to success. If, for instance, we are aware that under no circumstances shall we find a water-lily flowering on the thatch of an old cottage in January, we are at once released from what would otherwise have been an unprofitable quest, and are free to spend our energies in other and more profitable directions. It is on these salient

points—the probable time, the likely place—that the volume in question brings welcome aid."

Such is the information supplied by the publishers on the wrapper of Mr. Hulme's latest book. We ourselves should have thought that seclusion from the world in some suitable asylum would have brought more "welcome aid" than this volume could afford to the idiot (and to his friends) who would hunt for water-lilies upon cottage roofs; but the author himself tells us that the book owes its existence to a desire to provide for this class of person, which is evidently more numerous than we could have supposed. "It is borne in upon us," he says in his preface, "that some neophytes would also find a locality clue useful, thus saving them from seeking Water Lilies on the cottage roof or other unlikely spot, and that a chronological guide would be no less helpful, so that one could realize that it was a task foredoomed to disappointment to seek in sultry August for the tender flowers of the opening year, or to antedate by some few months the glorious flush of Heather crimsoning as far as eye can reach some breezy common or moorland slope." From which it will be seen that Mr. Hulme has a very fine style.

Messrs. Cassell have vast experience in catering for the public: "those delightful volumes, 'Familiar Wild Flowers'"—even modest men nowadays have ceased to be dumb concerning their own merits—have had a phenomenal sale, and this opportunity of utilizing some of the pretty if sometimes rather scrappy plates in a new form will no doubt prove attractive. It must in fairness be said that the little book is beautifully printed, attractively bound, and of a size most convenient for the pocket. If the literary part of the volume were as good as its outward appearance, we should have much to admire and little—indeed nothing—to criticize; but unfortunately this is far from being the case.

Mr. Hulme's acquaintance with his subject is manifestly but slight. For example, he recommends Hooker & Arnott's *British Flora* as "a most helpful book," apparently unaware that the work is obsolete and out of print, the last edition having appeared in 1860; Babington's *Manual* and *The Student's Flora* are not mentioned, and of Bentham's *Handbook* he knows only the illustrated edition. His knowledge of plants is scarcely more intimate—indeed, his statements are at times absolutely misleading, as when he says *Sambucus Ebulus* is "a similar looking *tree*" (!) to the Common Elder (p. 76), or that *Sium latifolium* has been mistaken for watercress (p. 191). What idea can be formed of *Arenaria trinervia* from the information—all that is given—that it "is now in these bright spring days frequently to be found, its special habitat being the woods and moist dells" (p. 39)? It cannot be pleaded that the exigencies of space have necessitated this brevity, for a large part of the book is occupied by padding such as the passage already quoted from the preface, or that (p. 126) on *Erysimum orientale*, which "came up once in our garden in Wiltshire, and we could only conclude that a seed of it must by chance have arrived with some flower-seeds which we had sent to us from

Battle. It is an interesting plant, and we were greatly pleased to see it." Again, when speaking of Buttercups (p. 45) Mr. Hulme gives absolutely no characters for distinguishing the various species, but limits *R. acris* to "the hedgerow" (!), and speculates whether a Buttercup found in flower in December "was in impatient anticipation of the spring, or a laggard unwillingness to admit that that season was at last over"—in December!

It would be easy to extend this criticism, but enough has been said to show that for instructive purposes the book is practically useless. Yet we have no doubt that it will be praised in the newspaper press—indeed, the publishers already advertise that "*Countryside* tells you: 'This book is invaluable'"—which unfortunately too often misleads where it ought to guide, especially when science is concerned. The proofs have not been carefully read: e.g. *Erythræa Centaurea* (twice), *Artemesia* (twice in index, where one of the pages refers to *Armeria vulgaris*, which is omitted from the index); on p. 29 the poet "Clare" is referred to as "Clara"!

We noticed Mr. Henslow's *How to Study Wild Flowers* on its first appearance eleven years ago, and are glad to see that it has arrived at a third impression. It is well-informed, instructive, and in the main accurate, and provides for the intelligent observer the kind of information in which Mr. Hulme's pretty little book is entirely lacking. This impression contains twelve double-page coloured plates of useful plants, evidently derived from some foreign source, which do not appeal to us. There are numerous helpful woodcuts in the text; we regret, however, to see that the inaccurate naming of these, which in our former notice we ventured to anticipate would "be corrected in the next edition," continues. There seems no excuse for continuing to label as *Daphne Mezereum*, *Gentiana Pneumonanthe*, *Euphorbia Peplus*, and the like, figures which certainly do not represent those species, nor for retaining the erroneous derivations given for "London Pride" and "Danewort"; and such misprints as "Catsia" for "Cassia" (in the index) should have been corrected. The index hardly deserves the favourable estimate we expressed in our former notice; the Latin names are excluded from it and appear by themselves in a table at the beginning of the book; some, e.g. *Linnæa*, are included in neither. We hope the book will be read through for the correction of these and other errors—*e. g.* the *Linnæa* is not now "represented on the wall of the staircase of the Linnean Society's rooms" (p. 129)—which, though not of the first importance, detract from its value.

Progressus Rei Botanicæ. Herausgegeben von der Association internationale des botanistes, redigiert von Dr. J. P. Lotsy in Leiden. Bd. I., Heft 2, 8vo, pp. 319–532, tt. 24. Jena: Fischer. 1907.

This second part of the *Progressus* contains three communications. Dr. L. Laurent, of the Marseilles Museum, contributes an account in French of the progress of angiospermic palæobotany

during the past decade; Mr. W. Bateson writes in English on the progress of genetics since the rediscovery of Mendel's papers; and Dr. Friedrich Czapek describes in German the progress of the physiology of plant-nutrition since 1896.

Dr. Laurent divides his subject-matter into four sections, under the titles—Investigations, Methods, Facts, Results. The regions investigated include in the southern hemisphere the extreme south of South America, where Mr. Dusen has studied plant-beds of presumed oligocene age, and Australia, where Mr. Deane finds reason to modify considerably the conclusions previously formed by Ettingshausen. M. Fliche has studied the cretaceous beds of Madagascar, and M. Zeiller the region of Lake Tchad in Central Africa; in tropical South America work has been done in Bolivia, Brazil, and Colombia, chiefly by Mr. Engelhardt, and the results indicate a great homogeneity in the flora, which resembles that of the present day. In Japan, Mr. Yokoyama has found in beds of neocomian age plants which are a continuation of the upper jurassic types and analogous to those found in Europe.

In discussing methods, Dr. Laurent adversely criticizes the method of the older palæobotanists in matching imprints of fossil leaves, often fragmentary or badly preserved, with those of recent plants, a practice which led to the description of numerous species of little or no value, and to general conclusions which a more careful study does not uphold. The character of the venation of the leaf remains the most important character for the worker in this field, as flowers are very rarely preserved, and fruits when found are not associated with the foliage, and the author lays stress on the importance of a careful comparative study of the venation of the various members of the same flora, and of these with known types in other floras.

As regards facts, one of the most important has been the gradual driving back of the origin of angiosperms right to the beginning of the cretaceous age. But up to the present there is no trustworthy information as to the relative antiquity of the two great divisions, Monocotyledons and Dicotyledons. The presumed ancient Monocotyledons have been based on incomplete material and yield to further study, while the *Protorhipis*, the presumed primitive Dicotyledons originating in the Lias, are now regarded as ferns of the *Platycerium* type. The question as to the former presence of *Proteaceæ* in Europe remains still unsettled. Dr. Laurent draws attention to a remarkable point in this connection; while on the one hand a large number of leaves have been referred to this family, there is an almost total absence of fruits and seeds, though these structures in the *Proteaceæ* are well adapted for preservation as fossils.

In discussing results, reference is made to the first appearance of *Gamopetalæ*. Facts observed prove their great antiquity, as *Nerium* and *Viburnum* are recorded from cretaceous beds; but the great majority of their representatives are unknown to us, while, on the other hand, apetalous orders are well represented in these early floras. Dr. Laurent points out that this contrast may be due to

the fewer number of woody genera in the gamopetalous as compared with the apetalous orders. This view is supported by the fact that the woody *Gamopetalæ* are precisely those which are represented in tertiary and cretaceous beds. The most important general results are the emphasis of the uniformity of the flora of the cretaceous period, as shown by the similarity of the types found in the old and new worlds respectively, and the indications that this period was succeeded by one of great differentiation.

Mr. Bateson's paper is an account of the progress in the study of heredity and variation which followed the rediscovery of Mendel's work in 1900 in the publications of De Vries, Correns, and Tschermak. The interest which this new branch of science—Genetics as it has been called—has aroused was strikingly shown in the success which attended the International Conference held last summer under the auspices of the Royal Horticultural Society. The report of the Conference recently issued by the Society shows even more forcibly than Mr. Bateson's essay the importance of this phase of biological investigation.

Finally, Dr. Czapek's contribution is a valuable epitome of the work done on the subject of plant-nutrition during the last ten years. The subject-matter is systematically arranged in nine chapters, and occupies more than one hundred pages.

A. B. R.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 18th April, 1907, Mr. James Saunders showed a series of lantern-slides of "Witches' Brooms," which he explained are usually caused by one of three agents: parasitic fungi (*Æcidium* and *Exoascus*), parasitic insects, and gnarling. The illustrations shown were of trees affected by parasitic fungi, the mycelium of which permeates in the woody tissue of the diseased plants. They included Silver Fir, Norway Spruce, Common Elm, Hazel, Hornbeam, Birch, Elder, Hawthorn, and Wild Cherry (*Prunus avium*). The Silver Fir was from Norfolk, but all the others from South Bedfordshire and North Hertfordshire. Mr. J. C. Shenstone read a paper "On the Œcological Functions of Stolons and Cleistogamous Flowers." He pointed out the advantages to the plants by the colony-forming habit, such as its more certain pollination and greater power of holding its own against competitors, instancing as examples *Bellis perennis*, *Thymus Serpyllum*, and *Mercurialis perennis*. Further examples were dwelt upon in the cases of *Urtica dioica*, *Adoxa Moschatellina*, and the violets *Viola odorata* and *V. canina*, where both stolons and cleistogamous flowers co-operate in keeping the colonies compact.

At the same meeting Mr. A. O. Walker introduced the subject of "The Conservation of existing Species by Constitutional or Physiological Variation giving greater power of adaptation without perceptible change of structure." He referred to a supposed case of two healthy men going to an unhealthy climate: one proving im-

mune to the local diseases might conceivably transmit that quality to his children; the other, falling a victim to the climate, would leave no descendants. As instances he brought forward the case of *Crepis taraxacifolia*, long known in Wales as a rarity, which in 1896 onwards became extremely abundant at Colwyn Bay. He considered that this might be accounted for by a different variety, morphologically identical, yet physiologically distinct, having been introduced, and, by its ability to adapt itself to its surroundings, had rapidly extended its area of growth. Another case was of *Cardamine pratensis*, usually stated to grow in moist meadows, which is accurate as regards North Wales, but in Kent its favourite habitat is coppice woods, the second year after cutting the undergrowth. It is frequent on dry banks, on masses of roots of trees or shrubs, probably as xerophilous a station as could be imagined.

At the meeting of the Linnean Society on 2nd May, 1907, Professor E. B. Poulton exhibited the probate of the will of Richard Anthony Salisbury (1761–1829). and manuscripts of Dr. W. J. Burchell, which had been recently presented to the University of Oxford by Mr. F. A. Burchell, of Rhodes University College, Grahamstown, South Africa. The General Secretary exhibited, on behalf of the owner, two portraits of John Fraser by John Hoppner and Sir George Raeburn — the latter being the unacknowledged source of the lithographed portrait in Hooker's *Companion to the Botanical Magazine*, ii. p. 300 (1836). A note accompanying the exhibit stated that Fraser's herbarium was presented in 1849 to the Linnean Society, of which he was a Fellow, by his son, but was disposed of in 1863. This, however, apparently refers, not to Fraser's own herbarium, of which nothing is known, although (see Comp. Bot. Mag. ii. 302) he evidently had one, but to the important herbarium of Thomas Walter, which was presented to Fraser by Walter, and was acquired by the Trustees of the British Museum for the National Herbarium at the sale of certain of the Linnean Society's collections in 1863.

Last year we called attention to the very interesting series of papers on *London Botanic Gardens*, which Mr. P. É. F. Perrédès, F.L.S., was then publishing in the *American Journal of Pharmacy*. These have now been issued in a neat volume of a hundred pages, with thirty-one illustrations, as No. 62 of the publications of the Wellcome Chemical Research Laboratories. The gardens discussed are Kew, the Royal Botanic Gardens, and the Chelsea Physic Garden—the last-named, on account of its longer history and greater interest, occupying half of the book. Mr. Perrédès has brought together a great deal of interesting information about the gardens and their various curators, and his account is careful, and, as far as space will allow, complete. It is to be regretted, however, that there is nothing in the shape of an index of names of the persons commemorated—an omission which detracts from the usefulness of the book.

The first volume of the new edition of the *Imperial Gazetteer of India*, which has just been published by the Clarendon Press (price 6*s*.

net) contains the very interesting sketch of the botany of the Indian Empire which was issued separately in advance in 1904 with the authority of the Secretary of State, and from which we gave some extracts in this Journal for that year (pp. 221–227). As we then said, the essay gives an admirable idea of the constituents of the Flora, which exhibits that masterly power of summary which Sir Joseph displayed in the celebrated essay on Island Floras and in other of his works. It is perhaps to be regretted that its publication in this form has been delayed for three years, as in some respects this prevents it from being quite "up-to-date," but it is and will remain an excellent epitome of our knowledge of the subject. The same volume contains chapters on the physical aspects, geology, meteorology, zoology, ethnology, languages, religions, and population—all evidently well and thoroughly done; it contains nearly 600 pages and is cheap at 6*s*.

The Rev. H. J. Riddelsdell has left Aberdare; communications should be addressed to him at St. Michael's College, Llandaff.

Referring to our note on p. 160 as to the desirability of giving a list of members and their addresses in the Reports of the Watson and Botanical Exchange Clubs, Mr. George Goode, the Secretary of the former, points out that such a list is given in the "List of Desiderata" which is sent to each member of the Club, and which we had not previously seen.

Since the note on p. 214 was written, we have received a Memorandum on the American Gooseberry Mildew issued by the Board of Agriculture, which urges upon growers the necessity of taking every possible precaution to prevent the spread of the disease. The statement is confirmed that the mildew has appeared in Worcestershire and Gloucestershire, and growers are advised what steps to take to destroy the fungus, or to modify its ravages. The Board also issues an illustrated leaflet, which is intended to assist growers in identifying the disease.

The Liverpool Botanical Society proposes to undertake a Flora of South Lancashire, *i. e.*, of that part of the county south of the Ribble. Mr. W. G. Travis, Secretary of the Flora Committee, will be glad to receive help of any kind in the way of records, specimens, &c.; his address is 107 Delamere Street, Liverpool.

The Queensland Government has issued a volume on *The Weeds and Suspected Poisonous Plants of Queensland*, by Mr. F. M. Bailey, "with brief botanical descriptions and accounts of the economic, noxious, or other properties, to which are added in most instances figures illustrating portions of the plants brought under notice." This full title gives a good idea of the scope of the book. The descriptions are based on those in the author's *Queensland Flora*, but are not mere transcriptions; the numerous figures are small and not very good, but should be helpful to the cultivator and stockholder, for whom they are principally intended. The subject is treated in a somewhat comprehensive manner; thus *Wolffia arrhiza* and a *Lemna* are included as being "troublesome in tubs and tanks set apart for the growth of ornamental aquatics."

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CONTENTS

PAGE

Maxwell Tylden Masters (1833–1907). (With Portrait) 257

Notes on British Hepaticæ. By Symers M. Macvicar.. 258

Alabastra Diversa.—Part XV. By Spencer le M. Moore, B.Sc., F.L.S. (continued) 263

Hybrids among British Phanerogams. By the Rev. E. F. Linton, M.A. 268

Forms of *Salsola Kali*. By C. E. Salmon, F.L.S. 277

Short Notes. — *Gymnadenia* × *Le Grandiana* G. Camus.—*Cephaloziella patula* (Steph.) Schiffn. in Britain.—*Ononis reclinata* L. in Glamorgan.—*Hypnum riparium* L. in New Zealand.—Seed-dispersal in *Euphorbia Chamæsyce* L.—Ecology of *Montia fontana*. — *Ophrys muscifera* var. *virescens* 278

Notices of Books:—

The Dillenian Herbaria: An Account of the Dillenian Collections in the Herbarium of the University of Oxford together with a Biographical Sketch of Dillenius, Selections from his Correspondence, Notes, &c. By G. Claridge Druce, Hon.M.A., Curator of the Fielding Herbarium. Edited, with an Introduction, by S. H. Vines, M.A., F.R.S.. 282

Cytological Studies in *Cyanophyceæ*. By Nathaniel Lyon Gardner 284

Book-Notes, News, &c. 286

Supplement. — A Flora of Glamorganshire. By H. J. Riddelsdell, M.A. (continued).

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MAXWELL TYLDEN MASTERS

MAXWELL TYLDEN MASTERS

(1833–1907).

(WITH PORTRAIT.)

ANOTHER noteworthy figure has disappeared from the ranks of British botanists in the person of Dr. Maxwell Tylden Masters, who died at his residence at Ealing on May 30, after a month's illness. He was born at Canterbury, on April 15, 1833. His father, William Masters, was well known in that city, not only as a nurseryman but as a pioneer of social and intellectual work; he founded the city museum in 1823, and for twenty-three years was its honorary curator. His garden, of which he published a catalogue under the title *Hortus Duroverni*, was arranged on the natural system, and he made experiments in hybridization in various genera, including *Passiflora*, of which genus his son became the monographer.

Maxwell Masters was educated at King's College, London, where he took his degree of M.D., after which he became sub-curator of the Fielding Herbarium at Oxford. While here he devoted much attention to the flora of the county; a paper embodying the results of his observations was published in the *Transactions of the Ashmolean Society*, to which he had previously contributed, in 1857. He practised his profession at Peckham in 1856, and from 1855 to 1868 lectured on botany at St. George's Hospital. It was while at Peckham that he became interested in Vegetable Teratology—a study in which he always took great interest and on which he published numerous papers. His book on the subject was published by the Ray Society in 1869; a German translation by Dammer appeared at Leipzig in 1886. In 1860 Masters became a Fellow of the Linnean Society, to whose Transactions and Journal he contributed many papers, among them valuable memoirs on *Passifloraceæ* and *Coniferæ*—orders with which his name will always be associated and in which he took a special interest. Papers from his pen appeared in numerous scientific journals—many of them in our own pages, beginning with our first volume, to which he was almost the last surviving contributor.

His chief literary work, however, was of course connected with the *Gardeners' Chronicle*, of which he became part editor with Thomas Moore in 1865; after Moore's death in 1887 the *Chronicle* was entirely under Masters's direction. Since the paper was established in 1841, many competitors have appeared in the field, but the *Chronicle* has always held its own, and has been the only horticultural journal which has steadily given prominence to the scientific side of horticulture. Masters always sought the co-operation of botanists, many of whom—Mr. J. G. Baker and Mr. W. B. Hemsley, for example—published largely in his paper; for many years the portion relating to orchids was under the superintendence of H. G. Reichenbach; and the number of new species published during the seventy years of the *Chronicle's* existence has been very

considerable. The demands made by a weekly paper on the time of an editor who devotes himself to it as conscientiously as Masters did to the *Chronicle* are of course very great; and it is remarkable that he succeeded in doing so much scientific work of a high order apart from his official duties—the more so because he took much practical interest in horticultural matters of a public nature, such as the great International Horticultural Exhibition of 1866, of which he was Congress Secretary; the Quinquennial Conferences at Ghent and similar meetings elsewhere; and especially the Royal Horticultural Society, of whose Scientific Committee he was Chairman for many years before his death.

Perhaps the most striking feature of Masters's character was his extreme kindness to those with whom he came in contact. I remember being struck with this when I was first introduced to him at the Kew Herbarium nearly forty years ago. He was always especially considerate to the young men at Kew, whether in the herbarium or in the gardens, encouraging them to write and helping them in many ways: many now well known in the botanical and horticultural world made their first literary appearance in the pages of the *Gardeners' Chronicle*. His gentle manner conveyed the impression of timidity; and he had a strong objection to anything which in his judgement savoured of controversy. This testimony to his kindliness, of little value when stated as the mere impression of one whose relations with him were only casual and official, is confirmed by those with whom he was in daily association.

I am indebted to the proprietors of the *Gardeners' Chronicle* for permission to reproduce the accompanying portrait, from a photograph taken in 1897, which appeared in the issue of that paper for June 1, accompanied by another portrait taken in 1873.

JAMES BRITTEN.

NOTES ON BRITISH HEPATICÆ.

BY SYMERS M. MACVICAR.

LOPHOZIA BAUERIANA Schiffn.—*Jung. Floerkii* Web. et M. var. *Baueriana* Schiffn. Krit. Bemerk. über *Jung. collaris* N. ab E. (Oester. Bot. Zeit. 1900, No. 8). Since publishing this plant as a variety, Prof. Schiffner has examined further material, which has induced him to consider it entitled to rank as a species with the other members of the *barbata* group. He goes fully into the question in the critical notes in *Lotus* 1903–1905 which accompany his *Hep. eur. exs.*, series ii.–iv. Herr Arnell, in a valuable paper on this group in *Bot. Notis.*, p. 145, 1906, follows Prof. Schiffner in treating it as a distinct species. It has only hitherto been published in Britain as a variety of *L. Floerkii*, but it appears to me, on further examination, that the view taken by Schiffner and Arnell is the more satisfactory one. Its relationship to *L. Floerkii* and to *L. lycopodioides* is given by these authors in the works referred to. It is stated by Schiffner that in Central Europe no

intermediate forms between *L. Baueriana* and *L. lycopodioides* have been found, but that such forms do occur in Scandinavia. One of these is represented in his *Hep. eur. exs.* No. 142. In a few instances in Scotland, especially from the extreme north, I have seen specimens which were difficult to distinguish from *L. lycopodioides*, while one gemmiferous plant from Windy Clough, West Lancashire, sent to me by Mr. Wheldon, closely approached *L. Floerkii*; but in the great majority of cases it can be readily distinguished from both species. As Arnell remarks, it is fortunate to have those forms which were formerly doubtfully placed to one species or to another of this group, recognized as a separate species, with the further advantage of being able to make more concise the characters which distinguish the others.

L. Baueriana is a very variable species; none of the characters which separate it from two above plants are constant, but they must be taken as a whole. The following points are the most usefnl in distinguishing it from *L. lycopodioides*. It is usually a smaller plant, the leaves are more symmetrical in shape, and more frequently only three-lobed; lobes more deeply divided, ovate instead of broadly triangular, and more frequently ending in a long bristle, sinus more often gibbose. Male plants and gemmæ are common, while both are stated to be very rare in *L. lycopodioides*. The gemmæ form red clusters on the margins and apices of lobes of the uppermost leaves, and are mostly irregularly 3–4-angled, but sometimes are ovate-oblong or oval. The distribution of the two plants in Britain is also different. So far as I have seen in Scotland, *L Baueriana* is a subalpine species, and is almost confined to the east, centre, and north of the country, from Berwickshire to Caithness and Sutherland. It is uncommon in the South-east Lowlands and Fife, frequent north of the Tay, and rather common in parts of the East Highlands and Caithness. It does not appear to be common on the hills, but ascends to at least 2600 ft. on Ben Lawers. Among the many English specimens of this group which I have examined, there is only Mr. Wheldon's West Lancashire plant which I would consider as belonging to this species. *L. lycopodioides* is entirely an alpine species in Britain. It is one of our rarest species, and is only known from a few localities in the Highlands. The specimens from snbalpine localities which I have seen in herbaria under this name have been *L. Baueriana*, except in one case, where it was the male plant of *L. quinquedentata* (Huds.).

L. Baueriana differs from *L. Floerkii* in the leaves being much more frequently four-lobed, one or more of the lobes being usually bristle-pointed. There are generally cilia at the base of the postical margin of the leaf, and male plants and gemmæ are common. The leaf-lobes in *L. Floerkii* are frequently acute, but never bristle-pointed; at the base of the postical margin there is usually, though not always, only a tooth or process; male plants are uncommon, and gemmæ apparently do not occur. This absence of gemmæ in *Floerkii* agrees also with the results of my examination of the plant in Britain.

L. Floerkii has been found in most of the counties of Scotland.

It is common in many parts of the southern counties, especially in the central subalpine districts, and extending to both west and east sides. It is rather common over the east, centre, and north of the country to Shetland, ascending the hills to 4000 ft. It is very rare in the West Highlands north of the Clyde watershed, and is almost absent from the Hebrides. Although it has an eastern distribution, especially marked to the north of the Forth and Clyde, it is not so much confined to that side of the country as is *L. Bauer-iana*, and its wide distribution over the south of Scotland is quite different from that of the latter. It is widely distributed over the northern half of England, but I have not sufficient information to give particulars.

Lophocolea alata Mitt. ex C. E. Larter, Trans. Devon. Ass. Adv. Sc. Litt. & Art. p. 285, 1906. Mr. Mitten, shortly before his death, sent to Miss Larter some notes and drawings of this plant, with permission for their publication. I take the following notes of his from the above Transactions.—"This hitherto undescribed species has the aspect of *Lophocolea bidentata*, but the angles of the triquetrous perianth are all widely alate; the alæ dentate." "So different in its perianth from all other British species, yet nearly allied to the *L. coadunata* of Swartz from Jamaica, having, like it, free floral leaves and amphigastrium oval, yet appearing different in areolation, and also in stature a little more robust." He mentions that the plant is monoicous, and refers to the var. *alata* of *Synopsis Hepaticarum*, of which "no specimens are available," and which "appeared to the authors of that work to be a monstrous variety of *L. bidentata*." The drawings consist of an enlarged figure of a perianth, bracteole, and piece of stem with leaves and underleaves. Below the leaves was written: "cells all same size, twice the size of 2-dentata," but this has inadvertently been omitted in the reproduction. The locality given is Lynmouth, August, 1875, W. Mitten.

Mitten stated in a letter to Miss Larter that he only picked a small specimen of the plant "on half an inch of soil." He evidently could not know that it varied considerably in the characters which he considered to be of consequence, and this makes it necessary to reconsider its status. Since the publication of the species I have seen a number of specimens of both it and the closely related *L. cuspidata* Limpr. from different parts of the country, and I have especially to thank Miss Larter for much trouble taken in procuring many specimens of the former in various stages of growth, from North Devon, not far from the original locality. In judging the position of the plant, the perianth alone is not a sufficient distinction, but the combined characters of the perianth, bracts, and bracteole must be taken. In *L. cuspidata* one or more angles of the perianth are occasionally winged and dentate, but probably never to such an extent as is seen in well-marked specimens of *L. alata*, though the size of the wings varies considerably in the latter. In the former, one frequently sees only two of the angles with more than one row of cells, and all the angles are usually only obtusely keeled, while in the latter the three angles

appear to have always more than one row of cells, and one or more always winged and frequently dentate. The wing varies in size, but is often composed of a single series of 6–9 cells superimposed on an angle thickened to the extent of several layers of cells. The mature bracts and bracteole are nearly always less deeply divided, and with the cuspidate points shorter than in *L. cuspidata*, and form, in my opinion, a more valuable distinctive mark than does the perianth alone. The bracteole is by no means always oval as in Mitten's figure. It varies considerably in shape, and not rarely has a tooth on one or both sides, but it is nearly always less deeply lobed than in *L. cuspidata*. Mitten is evidently mistaken in giving the leaf-cells as twice the size of those of *L. bidentata*. They do not appear to be larger than in *L. cuspidata*. The plant is generally dark green, and with the leaves rather broader than in the most commonly pale-coloured *L. cuspidata*, but this is not a reliable distinction.

I sent a small specimen of the North Devon plant to Prof. Schiffner. He remarked on the variation of its characters, and that the mouth of the perianth was similar to that of *L. cuspidata*, of which he considered it to be only a form. He also stated that it had no relationship to *L. coadunata*. It appears that more than one species has been described as Swartz's plant, and it is probable that Mitten had not seen the true plant of Jamaica. The description of this by Herr Stephani in the recently published part of *Spec. Hep.*, p. 146, does not at all correspond with *L. alata*, and it is mentioned that the plant which Spruce gives under Swartz's name does doubtless not belong to it. I sent a specimen of *L. alata* to Herr Stephani, but am doubtful if he considers it a distinct species.

Considering that the characters which distinguish *L. alata* from *L. cuspidata* are subject to considerable variation, and that such differences are only one of degree, I think that the former can hardly be regarded as of specific rank. I should feel inclined to look upon it as a subspecies of the latter. However this may be, in all the specimens which I have seen of both plants from various localities, I have rarely found any difficulty in distinguishing between them. Their distribution in Britain is also different. *L. alata* is more common than *L. cuspidata*, and to some extent takes the place of it, in some parts, at least, of the south of England, but becomes much rarer than the latter as we proceed northwards. It is evidently rare in Scotland, and has only been found, so far, in the southern counties. On the other hand, *L. cuspidata* is common and widely distributed throughout nearly the whole of the low-lying parts of Scotland.

L. bidentata (L.) Dum., is dioicous, and seems rarely to be found with perianths in Britain,

I have seen specimens of *L. alata* from the following localities:—Sussex: several localities, 1905–1907, *W. E. Nicholson*. Cornwall: Castle Horneck, Penzance, April 1, 1907, *W. E. Nicholson*. North Devon: Berrynarbor, 1907, *Miss C. E. Larter*. Somerset: near Failands, March, 1907, *Miss A. Fry*. Stafford: near Armitage, March, 1900, *H. P. Reader*. Pembroke: St. Ishmael's, January,

1906, and Dale, March, 1907, *A. Brinkman.* West Lancashire: near Caton, 1899, *J. A. Wheldon.* Kirkcudbright: Holme Glen, New Galloway, January, 1895, *J. McAndrew.* Berwick: Tower Dean, Cockburnspath, January 9, 1904, *W. Evans.*

Scapania obliqua (Arn.) Schiffn. *Martinellia obliqua* Arnell in Revue Bryol. 1905, p. 1. Herr Arnell has kindly confirmed the name of a specimen of this *Scapania* from Ben Vorlich, Dumbartonshire, July 4, 1901. I have also found it in my herbarium from other localities. It is readily distinguished from *S. undulata* by its oblique greatly decurrent antical lobe of leaf. The postical lobe is also more decurrent, the margins of both lobes are always entire, and the leaf-cells are slightly thickened at the angles. It occurs on our hills in wet ground, especially in streamlets and springs, forming large swelling masses of a dark green colour, with sometimes a purplish tinge in parts of the tufts.

S. paludosa C. Müll. is at once distinguished by its highly arched commissure of the leaf. The postical lobes are also occasionally dentate, and the plant is light green.

Prof. Schiffner states in his Bryol. Frag. xxii. in *Oesterr. Bot. Zeit.* 1905, that *S. obliqua* is most nearly related to *S. uliginosa*, and, in fact, mentions having seen intermediate forms; but as the former retains its characters in similar places to those in which *S. uliginosa* is found, and as the description of the latter would have to be considerably altered to include *S. obliqua*, he does not consider that it should be treated only as a variety. Well-marked specimens differ from *S. uliginosa* in colour, flaccidity, in the larger antical lobe of a different shape and more obliquely inserted. In a packet gathered on Ben Lawers there are some stems which I should place to *S. obliqua*, and some which appear indistinguishable from *S. uliginosa*. On the other hand, a specimen from Ben Doureinn, Argyllshire, which I find to be *S. obliqua*, bears comparatively little resemblance to *S. uliginosa*.

The localities, other than Ben Vorlich, in Britain, at present known for the plant, are:—Argyllshire: Ben Cruachan, alt. 1200 ft., June 10, 1903, *S.M.M.*; Ben Doureinn, June 25, 1904, *P. Ewing & S. M. M.*; Ben Arthur, alt. 1900 ft., June 29, 1906, *S. M. M.* Mid Perth: Ben Lawers, alt. 2700 ft., June 22, 1901, *S. M. M.* West Inverness: Roshven, Moidart, alt. 2500 ft. June 24, 1900, *S. M. M.* I should also feel inclined to include a plant gathered on Snowdon, alt. 2500 ft., May, 1904, by Mr. Pearson, which was considered to be a lax form of *S. uliginosa* by Herr C. Müller, as Mr. Pearson informs me. Also possibly a plant found by Messrs. Wheldon & Wilson on Treby Fell, West Lancashire, June, 1901; but the specimen is too small to distinguish with certainty from *S. uliginosa.*

Madotheca rivularis Nees var. simplicior (Zett.) Lindb. *M. simplicior* Zett. Oversigt. af Kongl. Vetensk. Akad. Handl. n. 2, p. 53, 1877. *M. Levieri* Jack et Steph. in Flora, n. 30-32, p. 496, 1888. In characteristic specimens of this variety the mode of branching is very different from that of the plant which is usually regarded as the type. The stems are long, with a few irregular

branches, which are often elongate and simple. As has been remarked, the habit is more like that of *M. lævigata*. It is also a larger plant than the type, and the colour is olive-green, frequently becoming yellowish green when dry, and occasionally shining. The stems have a border of 2–4 greatly thickened reddish cells, while the type has only the outermost row somewhat thickened, with the second row less so. Herr C. Müller, who has drawn attention to this character in *Beihefte z. Bot. Centralb.* p. 103, 1902, appears to reverse the two plants in regard to this condition. It varies considerably, doubtless in accordance with the wetness of the locality. *M. rivularis* varies so much that some of its forms are difficult to place. I give the localities of the specimens in my herbarium which I should consider to be the var. *simplicior*. That it is an advantage to have the variety distinguished may be allowed from the fact that it is frequently queried or mistaken in this country for some other species of the genus:—Lanark: Falls of Clyde, January, 1902, *P. Ewing*. Mid Perth: Finlarig Wood, Killin, July, 1900, *P. Ewing*; Culdees Castle, September 27, 1901, *W. Evans*; Falls of Ness, near Muthil, September 30, 1901, *W. Evans*; Buchanty, c. fr., November 5, 1903, *R. H. Meldrum*, Ireland—Down: Magheralin, April, 1897, *C. H. Waddell*. Antrim: Drumragmond Wood, Toone, July 4, 1899, *H. W. Lett*. Monaghan: Castleshane, July, 1900, *C. H. Waddell*.

M. RIVULARIS Nees VAR. FÆROENSIS C. Jensen in Bot. of the Færoes, Part i., Bryophyta, p. 124, 1901. "Tufts dense, opaque, deep green or partly brownish green; plant 2–3 centim. long, gracile, irregularly pinnate, dense-leaved, branches obtuse; auricles half as broad as the stipules, decurrent, obtuse or acute, one or both margins recurved entire; leaf-cells with thin walls and distinct trigones at the angles, the interior filled with chlorophyll, upper cells 0·013–0·020 millim. broad, smaller than in the typical form, where they are 0·020–0·032 millim." (C. Jens., *loc. cit.*). A plant found by Mr. Symington Grieve on "rocky banks, shores of Sandwater Loch, Bixter, Shetland, August 23, 1902," agrees with a specimen of this variety from the Færoes, kindly given to me by Herr Jensen. The compact, partly brown tufts are very different from what one usually associates with this species, and unlike any specimens which I have seen from the mainland.

ALABASTRA DIVERSA.—PART XV.

By SPENCER LE M. MOORE, B.Sc., F.L.S.

(Continued from p. 233.)

3. NEW AND RARE UGANDA PLANTS.

I NOW resume the task of publishing an account of Dr. Bagshawe's Uganda *Gamopetalæ*. The localities of the plants to be mentioned are largely those or near those of my last paper,* to

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* Journ. Bot. 1907, p. 41.

which the reader may be referred, with the reminder that the districts concerned are Unyoro, Ankole, and Toro, particularly the latter.

Rubiaceæ.

Gardenia lanciloba, sp. nov. Fruticosa, elata, glaberrima, ramulis juvenilibus compressis mox teretibus politis, foliis oblongis vel oblongo-lanceolatis cuspidato-acuminatis basi in petiolum brevem angustatis tenuiter coriaceis utrinque subnitidis in sicco olivaceis, stipulis lineari-subulatis cito deciduis, floribus pro rata mediocribus pedunculis manifestis supra-axillaribus oppositis patentibus suffultis, calycis tubo (ovario) turbinato glabro quam limbus multo breviore limbo alte 4–5-partito lobis foliaceis lineari-lanceolatis acutis uninervibus glaberrimis, corolla infundibuliformi ima basi attenuata inde gradatim dilatata lobis 4 vel 5 quam tubus multo brevioribus ovatis apice ipso acutis, antheris sessilibus infra fauces insertis, ovario 1-loculari, stylo incluso, stigmate clavato apice bidentato, bacca calycis limbo persistente onusta anguste ovoidea in sicco brunnea necnon longitrorsum nervosa, seminibus pluribus angulatis pulpa exigua agglutinatis.

Hab. Toro, Semliki Forest, near Baranga; *Bagshawe*, 1281.

Frutex (ex schedis cl. detectoris) biorgyalis. Folia 7·0–9·0 × 2·5–4·0 cm., fac. inf. pallidiora; costa centralis supra plana, subtus prominens; costæ secundariæ planæ, utrinque 5–6, aperte fornicatæ, raro subrectæ; petioli 0·5–0·8 cm. long., validi. Stipulæ circa 0·7 cm. long. Pedunculi 0·2 cm. super axillam cauli inserti, 2·0 cm. long., primo ascendentes cito patentes, sub fructu incrassati. Ovarium 0·5 cm. long. Flores primulini. Calycis limbus in toto 2·2 cm. long., hujus lobi 2·0 cm. Corollæ tubus 4·5 cm. long., ima basi 0·2 cm. juxta medium 2·5 cm. faucibus 3·0 cm. lat.; lobi circa 1·5 cm. long. Antheræ lineares, fere 1·0 cm. long. Stylus circa 2·8 cm., stigma 0·8 cm. long. Bacca calycis limbo exempto circiter 3·5 × 2·0 cm. Semina ± 1·2 × 0·7 cm.; testa coriacea; albumen cartilagineum.

Gardenia pomodora, sp. nov. Fruticosa ramis ramulisque patentibus puberulis deinde glabris, foliis ex ramulorum apicibus oriundis ibique confertis amplis petiolatis obovatis vel obovato-oblongis breviter cuspidatis obtusis vel obtuse acutis basi obtusis obtusissimisve raro rotundatis papyraceis supra scabriuscule puberulis subtus præsertim in nervis minute pubescentibus in sicco griseo-viridibus, stipulis inter se liberis anguste ovato-oblongis acutis vel breviter acuminatis membranaceis extus puberulis decoloribus, floribus ad normam generis mediocribus in corymbis terminalibus brevissimis paucifloris dispositis, pedicellis incrassatis quam ovarium brevioribus minute pubescentibus, ovario cylindrico minute pubescente calycem excedente, calycis minute pubescentis limbo alte 6-lobo lobis e basi lata subulatis divergentibus, corollæ sicc. atræ tubo infundibulari quam lobos 6 rotundato-ovatos obtusos longiore, antheris 6 sessilibus subinclusis, disco crateriformi, stylo breviter exserto basi dilatato, stigmate fusiformi, fructu oblongo apice leviter umbonato coriaceo glabro.

Hab. Kibale Forest, Toro, 4500 ft.; *Bagshawe*, 1234. (Also at Kew, Entebbe; *E. Brown*, 363).

Foliorum limbus solemniter 10·0–16·0 × 8·0–10·0 cm.; costæ secundariæ utrinque circa 8, paucæ basales subapproximatæ, omnes arcuato-ascendentes, utrobique eminentes; petioli sæpissime 2·5–4·5 cm., pubescentes. Stipulæ 1·0–1·7 cm. long., longitrorsum striatulæ. Corymbus (corollis exclusis) 2·5 cm. long. Pedicelli 0·5 cm. long; ovarium fere 1·0 cm. long. Calycis limbus 0·2 cm., lobi 0·5–0·6 cm. long. Corollæ dilute luteæ rubro-lineatæ tubus circa 2·5 cm. long., inferne 0·7 cm., superne 1·5 cm. diam.; limbi lobi circa 1·5 cm. long. Antheræ faucibus insertæ, oblongæ obtusæ, 1·3 cm. long. Stylus 2·5 cm. long., stigmate 0·7 cm. haud exempto. Fructus circa 9·0 × 2·5 cm.

The affinity is with *G. zanguebarica* Hiern, but this has so many points of difference as to render details unnecessary.

Flowers fleshy, with odour of over-ripe apples, faint yellow with red streaks. Mr. Brown's note, however, says that the flowers are "purple, spotted yellow." There is therefore some variation in this respect.

Oxyanthus oxycarpus, sp. nov. Frutex elatus, rariramosus, glaber, ramulis bene foliosis compressiusculis deinde subteretibus in nodis tumidis novellis summum leviter puberulis, foliis pro rata parvis anguste ovato-oblongis apice cuspidulatis ipso obtuse acutis basi in petiolum brevem angustatis tenuiter coriaceis, stipulis inter se liberis a basi lata subulato-acuminatis extus ima basi puberulis ceteroquin glabris, floribus mediocribus in racemis paucifloris bracteatis admodum abbreviatis ordinatis, bracteis parvulis ovato-lanceolatis acuminatis dorso puberulis margine ciliatis, pedicellis abbreviatis a bracteis plane superatis, calycis tubo (ovario) anguste obovoideo quam limbus breviore limbo fere adusque medium diviso lobis inter se subæqualibus lanceolatis acuminatis, corollæ tubo lobos longe excedente utrinsecus glabro vel fere glabro, filamentis brevibus antheris linearibus apice acuminatis loculis basi obtusis, ovario 2-loculari, stigmate anguste fusiformi lobis oblongis prædito, bacca ovoidea sursum attenuata apice obtusa subtereti 1-loculari pericarpio coriaceo in sicco olivaceo circumdata, seminibus numerosis.

Hab. Toro, forest near the Semliki river; *Bagshawe*, 1300.

Planta sec. cl. detectorem plus quam biorgyalis. Folia sæpissime 8·0–9·0 × 3·0–3·5 cm., in sicco viridia; costæ secundariæ utrinque 6–7, patulæ, juxta marginem arcuatæ, parum prominulæ; petioli 0·5–0·7 cm. long., fac. sup. excavati. Stipulæ 0·5–0·7 cm. long. Racemi 3–4-flori, ± 0·5 cm. long., crassiusculi. Pedicelli circa 0·3 cm., bracteæ circa 0·4 cm. long. Flores dilute viridescentes. Ovarium 0·2 × 0·175 cm. Calycis limbus 0·45 cm. long.; hujus lobi circa 0·2 cm. long. Corolla cito pansura 6·5 cm. long.; limbus 1·0 cm. long. Filamenta 0·1 cm. long., antheræ 0·35 cm. Bacca 2·5 cm. long., summum vix 1·5 cm. diam., apice sub calyce persistente ad 0·4 cm. angustata, in sicco longitrorsum striatula, pallide subnitens. Semina brunnea, 0·5 × 0·5 cm.

Easily distinguished from *O. speciosus* DC. by the short inflorescences, the relatively broad corollas, and the pointed berries.

Oxyanthus Bagshawei, sp. nov. Fruticosus, glaber, ramulis compressis deinde subteretibus in nodis aliquantulum tumidis, foliis majusculis anguste ovato-oblongis apice obtusis basi oblique cordatis tenuiter coriaceis petiolis abbreviatis validis fac. sup. late canaliculatis, stipulis late oblongis obtusis mox a latere altero semifissis altero omnino disjunctis firmis, floribus magnis in racemis axillaribus paucifloris ebracteatis quam folia multo brevioribus dispositis, pedicellis patuli-ascendentibus validis calycem manifeste excedentibus, calycis tubo (ovario) subcylindrico quam limbus satis latus ore undulatus paullulum longiore, corollæ tubo elongato lobos longe excedente extus glabro intus deorsum araneoso, filamentis abbreviatis antheris linearibus apice acuminatis basi sagittulatis, ovario 2-loculari, stigmate anguste fusiformi lobis lanceolatis brevibus, bacca ——.

Hab. Toro, forest-bank of the Semliki River; *Bagshawe*, 1285.

Folia in sicco læte viridia, pag. inf. pallidiora, adusque 20·0 × 8·0 cm.; costæ secundariæ utrinque circa 10, basales apertissime fornicatæ, reliquæ patuli-ascendentes, marginem versus arcuatæ, omnes supra planæ subtus eminentes; petioli ± 0·5 cm. long. Stipulæ circa 1·5 cm. long. Racemi 7-flori, validi, compressi, 3·0–3·5 cm. long. Pedicelli ± 1·0 cm. long. Flores virescenti-albi. Calycis tubus (ovarium) 0·35 cm. long.; limbus 0·3 cm. long., ægre 0·4 cm. diam. Corolla tota humectata 19·5 cm. long.; tubus 17·0 cm., lobi 2·5 cm. long. Filamenta vix 0·1 cm. long., antheræ 0·9 cm., stigma 0·7 cm. long., hujus lobi 0·125 cm.

Near *O. formosus* Hook., from which it differs, *inter alia*, in the inflorescence, the broader corollas, and the calyx.

Canthium myrtifolium, sp. nov. Fruticosum, glabrum, ramulis patuli-ascendentibus gracilibus sat crebro foliosis ad nodos tumidis, foliis submediocribus ovatis apice leviter cuspidatis ipso obtusis basi obtusis rotundatisve coriaceis supra nitidis castaneis subtus opacis petiolis abbreviatis crassiusculis, stipulis ima basi dilatatis inde lineari-subulatis rigidis diuscule persistentibus, floribus parvulis 5-meris in fasciculis axillaribus sessilibus paucifloris dispositis, pedicellis quam calyx plane longioribus gracilibus puberulis, ovario depresse hemisphæricali quam calyx longiore, calycis perbrevis limbo 5-dentato dentibus triangularibus acutis margine ciliolatis, corollæ parvæ extus leviter glanduloso-puberulæ tubo brevi sat lato intus juxta fauces annulatim barbato limbi lobis tubum breviter excedentibus anguste ovato-oblongis obtusis cito reflexis, staminibus subsessilibus antheris ovato-oblongis basi breviter sagittatis, disco glabro, stylo leviter exserto glabro, stigmate mitreformi.

Hab. Toro, forest near mouth of the Mpanga; *Bagshawe*, 1152.

Folia 3·0–5·0 × 1·7–3·0 cm.; costæ secundariæ utrinque 4, ascendenti-patulæ, marginem versus aperte fornicatæ, utrobique paullo eminentes; petioli 0·2–0·3 cm. long. Stipulæ 0·3–0·4 cm. long. Florum virescentum fasciculi 0·7–1·0 cm. diam. Pedicelli 0·5–0·6 cm. long. Ovarium 0·1 cm., calycis limbus 0·075 cm. long. Corolla in toto 0·45 cm. long.; tubus 0·2 cm. long., ima basi

0·125 cm., faucibus 0·175 cm. diam.; lobi 0·25 cm. long. Filamenta 0·1 cm., antheræ 0·15 cm. long. Stylus 0·4 cm., stigma 0·12 cm. long.

This can be at once distinguished from *C. Schimperianum* A. Rich. by the smaller leaves, the fewer-flowered fascicles, the short pedicels, and small corollas.

Pavetta graveolens, sp. nov. Fruticosa, elata, ramulis rigidis bene foliosis cortice sordido cito circumdatis glabris novellis minute griseo-pubescentibus, foliis petiolatis oblanceolatis vel oblanceolato-linearibus acutis vel breviter acuminatis nonnunquam obtusis basin versus gradatim attenuatis coriaceis glabris eximie nervulosis in sicco nigrescentibus fac. sup. nitidis inf. aliquando griseo-viridibus, stipulis deorsum dilatatis sursum angustatis extus minute puberulis, floribus in corymbis terminalibus brevibus pedunculatis sublaxifloris griseo-pubescentibus digestis, bracteis parvis subulatis minute pubescentibus, pedicellis calycem æquantibus vel quam is brevioribus, ovario ovoideo calycis limbo fere æquilongo minute pubescente, calycis limbo anguste campanulato ad $\frac{1}{2}$ in lobos triangulari-deltoideos acutos diviso, corollæ parvulæ tubo calycem breviter excedente latiusculo uniformi lobis 5 oblongis obtusis cito reflexis tubo duplo longioribus, filamentis corollæ ori insertis antheris exsertis apice acutis, stylo breviter exserto pilosiusculo, stigmate anguste fusiformi apice bifido.

Hab. Toro, forest near mouth of Mpanga; *Bagshawe*, 1173.

Folia modice 8·0–10·0 × 2·5–3·0 cm., pauca juvenilia ± 6·0 × 0·15 cm.; costæ secundariæ utrinque 9–10, ascendentes, juxta marginem leviter fornicatæ, ut costulæ elegantulæ utrobique eminentes; petioli adusque 1·5 cm. long. vel etiam paullo magis; stipulæ 0·5–0·6 cm. long., diuscule persistentes. Corymbi 5·0–8·0 × 4·0–5·0 cm. Bracteæ inferiores circa 0·3 cm. long., superiores imminutæ. Pedicelli sæpissime 0·1–0·2 cm. long. Flores albi, graveolentes. Calyx totus 0·2 cm. (ovarium 0·1 cm., limbus 0·1 cm., lobi 0·05 cm. long.). Corolla in toto 0·6 cm. long.; tubus 0·2 × 0·14 cm., ima basi levissime coartatus; lobi 0·4 cm. long. Stylus 0·5 cm., stigma circa 0·3 cm. long. Bacca sphæroidea, microscopice puberula, calycis limbo persistente onusta, 0·4 × 0·4 cm.

In general appearance resembles *P. neurophylla* S. Moore from Rhodesia, but the flowers are different in several respects. The very short corollas are a prominent feature of the species.

Pavetta albertina, sp. nov. Verisimiliter fruticosa ramulis validis glabris cortice albido mox circumdatis novellis puberulis, foliis pro rata parvis lanceolatis vel lanceolato-oblongis obtusis basi in petiolum brevem cuneatim attenuatis membranaceis glabris in sicco viridibus, stipulis a basi lata diuscule persistente in appendicem brevem lineari-subulatam deciduam subito excurrentibus extus puberulis intus basi hirsutis, floribus mediocribus tetrameris ad apicem ramulorum validorum brevium vel perbrevium dense umbellatis, pedicellis abbreviatis puberulis, calycis puberuli tubo (ovario) subsphæroideo quam limbus paullulum breviori limbo adusque medium in lobos triangulares obtuse acutos diviso, corollæ glabræ tubo angusto uniformi quam lobi oblongi obtusi duplo

longiore, filamentis corollæ ori insertis, antheris exsertis, stylo longiuscule exserto puberulo, stigmate anguste clavato integro.

Hab. Near mouth of Mizizi, south-east of Lake Albert; *Bagshawe*, 1318.

Folia solemniter 4·0–6·0 cm. long., 1·5–2·0 cm. lat.; costæ secundariæ utrinque 4–6, ascendentes, parum aspectabiles; stipulæ circa 0·3 cm. long. Umbellæ plurifloræ, circa 3·0 cm. diam. Pedicelli 0·1–0·2 cm. long. Flores albi. Calycis tubus (ovarium) 0·1 cm. long.; limbus totus 0·15 cm., lobi 0·08 cm. long. Corolla in toto 1·7 cm. long.; tubus 1·1 cm., lobi 0·6 cm. long. Filamenta crassiuscula, 0·15 cm. long.; antheræ anguste lineares, apice apiculatæ, 0·5 cm. long. Stylus 2·2 cm., stigma circa 0·25 cm. long.

Evidently not far away from *P. lasiopeplus* K. Schum., which is described as having smaller leaves, bimucronulate stipules, flowers on longer pedicels in umbels with a number of bracts at the base, calyx-limb divided nearly to the base into subulate lobes, &c. It is also near the plant called by me *P. grumosa*, another of Dr. Bagshawe's discoveries; but this, besides drying black, has a different calyx among other points.

(To be continued.)

HYBRIDS AMONG BRITISH PHANEROGAMS.

By the Rev. E. F. Linton, M.A.

Some years ago there were those still among us who doubted the occurrence of hybrids among plants in a state of nature, and in a paper on the subject one might have been expected to furnish proof of their being naturally produced. There is no need of this now; rather the danger is the other way of too much being made of hybrids, and hybridity being set up as the chief factor of variation in all genera where great variety occurs. There are some cases that support such a view, notably the genus *Salix*. But to argue from the particular to the general is an old fallacy. In the case of *Salix* we certainly have an instance in which many forms have been mistaken in the past for species which were of hybrid origin. All these being apparently fertile (if female), there was some reason for the botanists of a generation or two ago regarding them as species or varieties. Now we know, from observation and experiment combined, that the large majority of these forms were produced by hybridization.

In the genus *Mentha*, also, several forms have been published and repeatedly described as species or varieties which are hybrids; in this genus the hybrid resultants are sterile, and the form is preserved and spread by strong, rapidly-increasing suckers.

This difference between the cases of *Salix* and *Mentha* brings me to one object I have in preparing this paper. I wish to suggest a line of observation which may not only be of some interest, but

also redeem the subject of it from a charge of barrenness. While in *Salix* hybrids we find fertility the rule, and in *Mentha* hybrids sterility, there are genera in which it is not quite clear what the rule is: do we, for instance, know the habits of *Rosæ* in this respect? The testimony is somewhat conflicting; and this may suggest another question wanting solution: whether the rule of sterility or the reverse always holds good throughout a genus, or an order? Then there are genera where it is still in question whether some of the forms are hybrids or species, as in *Pyrus* (*Sorbus*). Such as these stand in need of experimental treatment rather than observation.

I am inclined to think with regard to hybridity in plant life that we must not expect to be able to reduce all cases to one rigid rule; and therefore we must not draw inferences as to the habits of one genus from the habits of another. The botanists of the earlier half of last century either refused to believe in natural hybrids (as Sir J. E. Smith with the Willows), or held that, while the cross-offspring of varieties was fertile, the cross-offspring of species was always sterile. They were too servile to the idea of uniformity in nature; and these prejudices long stood in the way of progress being made in understanding the habits of hybrids and the part they have played in the economy of nature.

The last edition (ninth) of the *London Catalogue of British Plants* made an attempt to distinguish the forms which were accepted as hybrids with a × placed between the names of the parent species; but there was no consistency of method; the work could not be called up to date; many hybrids still stood in the list numbered as species, and some few were lettered as varieties. In the next edition (tenth) it should be possible to make some advance towards a complete enumeration of British hybrids, and a consistent method of exhibiting them in the list.

With this object in view, as well as that mentioned above, I propose to catalogue here all the phanerogams which are known or believed to be of hybrid origin in this country, and some others which have been under suspicion or question, so far as I am acquainted with them, in the hope that other observers may supplement the list, remove queries, and record fertility or sterility where that character is not ascertained.

No attempt is made in this paper to represent the geographical distribution of the hybrids that have been recorded for Britain. Localities are referred to chiefly when only one or two are known to me, or when it is doubtful whether they have been published. I have to thank several friends who have given me help, especially the Rev. E. S. Marshall for very numerous comments and criticisms, and for all the observations here quoted from Dr. Focke's *Pflanzenmischlinge*; the Rev. W. Moyle Rogers for a list of *Rubi*; Mr. Alfred Fryer for a valuable letter on *Potamogeton*; Mr. Arthur Bennett for a most helpful list of hybrids in the same genus; also the Revs. A. Ley and W. R. Linton, and Mr. G. C. Druce.

Ranunculaceæ.—*Thalictrum.* Rouy & Foucaud (*Fl. de France*) report that Dr. Focke derives *T. odoratum* G. & G. from *T. fœtidum*

and *T. minus*. From limestone rocks, W. Yorks, Mr. A. E. Bradley sent me a series of specimens, some of which were *T. collinum* Wallr., some *T. odoratum*, and one was a near approach to *T. fœtidum*; but I am not sure of the latter for Britain yet.

Ranunculus Baudotii × *Drouettii*, *R. Baudotii* × *heterophyllus*, *R. peltatus* × *trichophyllus*, and *R. peltatus* × *Lenormandi* are given by Messrs. H. & J. Groves in *Bab. Man.* ed. ix.; and the last-named is said to be partially fertile (*Journ. Bot.* 1901, 121).

Papaveraceæ.—*Papaver dubium* × *Rhœas* was once issued by Mr. G. Nicholson, if I remember rightly, the name being based on the shape of the capsule mainly. I remember seeing *P. Rhœas* forms with similar intermediate capsules in Norfolk, but did not arrive at any conclusion.

Fumariaceæ.—*Fumaria densiflora* × *officinalis* is reported (p. 120) by Mr. C. E. Salmon from near Wendover, Bucks, who says the plants were apparently quite barren, as well as intermediate in character.

Cruciferæ.—*Cardamine pratensis* × *flexuosa* was reported from between Kew and Mortlake by Mr. George Nicholson, and issued through the Botanical Exchange Club (*Rept.* 1879, p. 5) as var. *Hayneana* Welw. A similar plant was found in Shapwick by Rev. W. R. Linton, which we regarded as this hybrid without any doubt. On growing a root at Bournemouth for two seasons, it proved perfectly sterile.

Cochlearia. Mr. Marshall once reported a hybrid from his garden at Milford, but he tells me he is not sure that any have occurred wild.

Cistaceæ.—*Helianthemum Chamæcistus* × *polifolium* (*H. sulphureum* Willd.), Purn Hill, Bleadon, N. Somerset; referred to in the Rev. R. P. Murray's *Flora of Somerset*.

Violaceæ.—*Viola hirta* × *odorata*, local, but not very rare; according to my experience, sterile; Rouy & Foucaud say, sterile or with 2–6 seeds.—*V. silvestris* × *Riviniana* has been detected by the Rev. W. R. Linton at Shirley in the garden and neighbourhood, and is sterile.—*V. Riviniana* × *ericetorum*, more widely distributed than the last. I have met with it three times at least in Dorset; always sterile.—*V. ericetorum* × *lactea* was sterile near Bournemouth, and probably elsewhere.—*V. ericetorum* × *stagnina* was, I believe, sterile on Holme Fen. To these, Mr. Marshall tells me, may be added *V. lactea* × *Riviniana*, discovered by Dr. W. A. Shoolbred on Tidenham Chase, v.-c. 34, W. Gloster. Dr. Focke says this hybrid (*V. lancifolia* Thore × *Riviniana* Rchb.) is alleged to have been observed in France.—*V. arvensis* × *tricolor*, which I have put on record for Dorset, produced what looked like good seed and capsules well-formed; it is doubtful whether there is specific difference between these. I have also seen in Dorset both *V. arvensis* (Baileygate) and *V. tricolor* form (Blandford) crossed by some garden pansy.

Caryophyllaceæ.—*Silene*. Darwin (*Origin of Species*) says that, while several hybrids have been made between species of *Dianthus*,

none have been produced in this genus, though often attempted. One was formerly reported between *S. anglica* L. and *S. quinquevulnera* L., but withdrawn in the last *London Catalogue*. I cannot say whether it was right. Rouy & Foucaud do not give it, but they give (*Fl. France*, iii. 107) *S. inflata* × *maritima* as the solitary case in the genus; this hybrid I have formerly published from near Cheddar, and Major A. H. Wolley-Dod from Woolwich Arsenal, and both plants seem to me rightly diagnosed. There are several *Dianthus* hybrids reported in the *Flore de France*. *Lychnis alba* × *dioica* has been occasionally met with. Rouy & Foucaud report its occurrence here and there in France with the parents; and Dr. Focke says it has been found in many parts of Germany. Mr. Druce tells me that it is fertile.

Hypericaceæ. — *Hypericum humifusum* × *linarifolium*. Miss Dawber sent a plant to the Watson Botanical Exchange Club in 1888–89 from St. Catherine's, Jersey, labelled *H. linarifolium* Vahl, which Mr. Bennett said, in the *Report*, was nearer *H. humifusum* L., questioning whether it was not the plant Syme referred to (*Engl. Bot.* vol. ii. p. 156, 1864) as strangely intermediate between these two species, some specimens approaching to the one parent and some to the other. My specimens of the gathering were *H. linarifolium*, but there seems good reason to believe that Syme, and perhaps Miss Dawber, had lit upon the hybrid.

Leguminosæ.—*Medicago silvestris* Fr. Nyman supposes this to have sprung from *M. sativa* L. and *M. falcata* Fr., and to have become fixed nearer the latter. Rouy & Foucaud (*Fl. France*, t. v. pp. 12, 13) recognize the hybrid, and call it *pseudo-falcata* Rouy & F., but place *M. silvestris* as a variety under *M. falcata* Fr.

Rosaceæ.—*Rubus*. The hybrids which have been observed in this genus are fairly numerous, even in this country, where no great amount of attention has been paid them. They were not placed in the *London Catalogue* (ed. 9), though several had been ascertained by the Revs. W. Moyle Rogers, A. Ley, W. R. Linton, R. P. Murray, and myself previously to its issue. Those now given are a limited list which the Rev. W. M. Rogers has kindly supplied, and which he considers may be relied on, having seen most of them in the living state, and had them all in his herbarium:—*R. holerythros* F. × *Sprengelii* Weihe; Surrey.—*R. Lindleianus* Lees × *radula* Weihe; Derbyshire (I add Dorset). — *R. rusticanus* Merc. × *R. affinis* Wh. & N. var. *Briggsianus* Rogers; several localities in Devon and Cornwall. — *R. rusticanus* × *corylifolius* Sm.; Dorset; probably frequent.—*R. rusticanus* × *leucostachys* Sm.; many localities in Dorset, Hants, Glamorgan, Hereford, Worcester, Derby (I add Suffolk, E.).—*R. rusticanus* × *holerythros*; Surrey. — *R. rusticanus* × *argenteus* W. & N.; Somerset.—*R. rusticanus* × *mutabilis* Genev.; Surrey.— *R. rusticanus* × *Lindleianus*; Surrey. — *R. leucostachys* × *foliosus* W. & N.; Kent. — *R. leucostachys* × *imbricatus* Hort.; Surrey. — *R. leucostachys* × *pulcherrimus* Neum.; Surrey. — *R. leucostachys* × *Sprengelii*; Derby. — *R. leucostachys* × *Marshalli* F. & R.; Surrey. — *R. mucronatus* × *infecundus* Rogers; Here-

ford.—*R. anglosaxonicus* Gelert × *rudis* W. & N.; Derby.—*R. cæsius* L. × *idæus* L.; Dorset, Hants, Surrey, Staffs (I add Sussex). These are sufficient to show that a fair number of British hybrids exist, and are certified by Mr. Rogers; I do not wish to throw doubt upon others that have been recorded by omitting them here. They may be perfectly barren, as I have seen a large bush of *R. leucostachys* × *rusticanus* in Suffolk, or with a few perfect drupes which may contain fertile seeds; *e. g.* the Rev. E. S. Marshall and I saw a large colony of *R. cæsius* × *idæus* north of Arundel in 1901, and could only find one single drupe each in the whole lot. It is not unlikely that some of the numerous *R. dumetorum* forms are hybrids or of hybrid origin. I have seen one of these in large quantity on Breamore Down, Hants, entirely barren, and judged both by Dr. Focke and myself to be a hybrid.

Geum intermedium Ehrh. The plant I am familiar with in Dorset and Wilts is undoubtedly *G. rivale* × *urbanum*, and this is no doubt the common view. Mr. G. C. Druce assures me that it is fertile, and its seed is offered by the Cambridge Botanic Garden. *Potentilla* produces in this country the three hybrids between *P. procumbens*, *reptans*, and *silvestris*. Mr. Marshall thinks that some of those that have been met with may be secondary crosses with the parents, and quotes Focke to the effect that fruit is produced, though sparingly, in this group of hybrids.

In the genus *Rosa*, M. Crépin held distinctly that some forms were of hybrid origin, notably the groups of *R. involuta* and *R. hibernica*. The latter name has been given to forms of *R. spinosissima* × *canina* or × *glauca*; while *R. spinosissima* hybrids with *R. mollis* and *tomentosa* vars. have given us *R. involuta* and many of its varieties. There is recorded besides *R. pimpinellifolia* × *rubiginosa* from Kent and Perth; and Mr. Marshall also tells me that Major Wolley-Dod has found a rose which seems to be *R. tomentosa* × *tomentella*, and that Mr. Rogers considers *R. pseudo-rusticana* to be *R. arvensis* × *systyla*. With regard to fertility or otherwise, Mr. Marshall has noticed the fruits falling off before maturing in some *R. involuta* forms; Rev. W. R. Linton has noticed *R. mollis* × *spinosissima* in Chee Dale quite sterile. On the other hand, Mr. Baker describes the fruits of several *R. involuta* varieties; Mr. Druce believes *R. mollis* × *spinosissima* produces fertile seeds. My own impression is that some rose hybrids at least are fertile. Lord Penzance has produced several striking hybrids between *R. rubiginosa* L. and sundry old-fashioned garden roses; and Messrs. Keynes, Williams & Co., of Salisbury, who deal largely in these interesting products, have written in answer to my question that these "Hybrid Sweetbriars produce fertile seed in abundance, but the seedlings produced by it nearly all partake of the Sweetbriar, very few of them indeed showing any tendency to produce plants like the parents: many of the other Hybrid Roses produce seed more or less freely, but their offspring is very erratic and uncertain." It seems to follow from the evidence that, while some hybrid rose-bushes have been observed not bearing perfect fruit, the contrary

is frequently the case with wild roses, and usually so with those which are under cultivation.

Pyrus Aria Ehrh. has long been supposed by some botanists to produce hybrids with *P. Aucuparia* Ehrh. and *P. torminalis* Ehrh. Prof. Koehne is an advocate of several forms in this *Sorbus* section resulting from hybridity. Dr. Focke says (p. 145), "*P. Aucuparia* × *scandica* Bab. is *Sorbus hybrida* L., one of the few hybrids which were rightly determined by Linné"; and he gives other examples. The Rev. A. Ley, who knows the British forms in the field better than any of us, holds, on the contrary, that none of our *Sorbus* forms are real hybrids, adducing the fertility of our various plants as conclusive evidence. Judging, however, from what is stated above with reference to hybrids of *Geum* and *Rosa*, we must not assume the fertility of a plant to be conclusive evidence against a hybrid origin; and, on the whole, I am inclined to believe that some at least if not all the forms which have been put under *P. pinnatifida* Ehrh. are hybrid forms of which *P. Aucuparia* is one parent, and that some of the plants which are called *Sorbus latifolia* P. are *P. Aria* × *torminalis*. Perhaps some botanic garden will experiment. *Cratægus oxyacantha* × *monogyna* is only a cross between varieties.

Droseraceæ.—*Drosera anglica* × *rotundifolia* (*D. obovata* Mert. & Koch), produced only on very soft boggy ground in my experience. It is remarkable that *D. rotundifolia* L. and *D. intermedia* Hayne should produce no hybrid, though often growing abundantly together.

Onagraceæ.—*Epilobium* has produced numerous combinations which are correctly stated in the *London Catalogue*, ed. 9. *E. hirsutum* L. crosses with *E. lanceolatum*, *montanum*, *obscurum*, and *parviflorum*; *E. parviflorum* Schreb. with *roseum*; *E. montanum* L. with *E. obscurum*, *palustre*, *parviflorum*, *roseum*; *E. lanceolatum* Seb. & Maur. crosses with *E. montanum*, *obscurum*, *parviflorum*, and *roseum*; *E. adnatum* Grisebach with *E. Lamyi*, *montanum*, *obscurum*, *palustre*, *parviflorum*, and also, as a garden hybrid at Milford, Surrey, with *E. lanceolatum*; *E. obscurum* Schreb. crosses with *E. palustre*, *parviflorum*, and *roseum*; *E. Lamyi* F. Schultz with *E. lanceolatum*, *montanum*, *obscurum*, and *parviflorum*; *E. palustre* L. with *E. parviflorum* and *roseum*; *E. alsinefolium* Vill. with *E. anagallidifolium*, *montanum*, *obscurum*, and *palustre*; *E. anagallidifolium* Lam. with *E. obscurum* and *palustre*. Mr. Marshall has no additions to make to this list, and he tells me that he believes *Epilobium* hybrids to be, as a rule, completely sterile. Mr. G. C. Druce states very positively that they are fertile. I must confess that I am rather puzzled by this statement, for I incline to Mr. Marshall's view. I have seen few in the right condition for forming an opinion, but those few appeared to me to be producing no seed.

Rubiaceæ.—*Galium Mollugo* × *verum* has occurred in several places, and is, I think, our only hybrid in the genus. M. Rouy (*Fl. France*, viii. 19, &c.) gives *G. ochroleucum* Wolf. ap. Schweigg et Kœrte *Fl. Erlang.* (1811) as the name for an aggregate hybrid between forms of these two, with many named varieties. He also

records *G. boreale* × *verum*. I see no reference to fruit in the brief descriptions.

Compositæ.—*Erigeron acer* × *canadensis*, reported by Rev. E. S. Marshall (p. 164), does not appear to be known for France, but is given by Focke for several places in East Germany.—*Senecio vulgaris* × *squalidus* is perfectly fertile, and has become something of a weed in the Cambridge Botanic Garden; so I learn from Mr. R. I. Lynch, who adds that he believes *S. albescens* (*S. cineraria* × *Jacobæa*, see *Journ. Bot.* 1902, 401) to be also quite fertile.—*Carduus crispus* × *nutans* (*C. Newbouldi* H. C. Watson), occurring here and there with the parents, is sterile in my experience.—*Cnicus palustris* × *pratensis* (*C. Forsteri* Sm.) was sterile in Westmeath.—*C. heterophyllus* × *palustris* (*C. Wankelli* Reich.) is given by Nyman for Saxony, Bohemia, &c.; and as *C. Carolorum* Jenner by Dr. Focke for England, E. Germany, Styria, Bohemia, and Russia.—*C. acaulis* × *arvensis* (*C. Clarkei* H. C. Watson) and *C. acaulis* × *pratensis* (*C. Woodwardii* H. C. Watson) are recorded as British.

Hieracium in the *London Catalogue* has two hybrids indicated in the usual way, viz., *H. anglicum* × *hypochæroides* and *H. boreale* × *sciaphilum*. Of the latter I know nothing, but understood that it was found growing with the supposed parents, and judged by Mr. F. J. Hanbury to be a hybrid. The former (*teste* W. R. Linton) cultivation has proved to be a mistake, and it has been named *H. hypochæroides* Gibs. var. *lancifolium* W. R. Linton. The Rev. A. Ley writes to me that he has found undoubted wild *H. corymbosum* × *boreale*, and one or two hybrids have come up in his Hawkweed garden spontaneously; but I have no particulars of these. Under cultivation Mendel and Schultes have raised hybrids in this genus; but neither the Rev. W. R. Linton, nor Rev. E. S. Marshall, nor Mr. F. J. Hanbury, nor myself, who have all cultivated large numbers of different species in close proximity at the same time, have been able to detect any hybrid among the numerous seedlings which were allowed to flower; we are none of us opposed to the theory of hybridity accounting for the multitudinous forms, if the evidence prove favourable; but in our several experience the supporting evidence has not been forthcoming.

Ericaceæ.—*Vaccinium Myrtillus* × *Vitis-Idæa* (*V. intermedium* Ruthe) I believe has not been reported from any but the original station.

Erica ciliaris × *Tetralix* (*E. Watsoni* Bentham). I did not examine this plant for fruit when I had it, but assumed its sterility (perhaps too readily); it produced no seedlings during the years it was in cultivation with me, and in a native station near Parkstone, Dorset, I observed the plants of the hybrid continuing to flower some time after *E. ciliaris* had entirely ceased; *E. Tetralix* had stopped still earlier. *E. Mackaii* is, says Focke (*l. c.*, p. 232), "evidently a hybrid of *E. Tetralix* L.; the other parent is probably *E. cinerea* L. (or *E. mediterranea* L., or *E. ciliaris* L.?)." I do not think, nor does Mr. Marshall, that anybody who has gathered *E. Mackaii*, or seen it fresh gathered, as I have done, would agree that any of these suggestions hits the mark.

E. Stuarti Linton was described in *Ann. Sc. Nat. Hist.* 1902, 177, as being derived from *E. Mackaii* and *E. mediterranea* (*Journ. Bot.* 1902, 363).

PLUMBAGINACEÆ.—*Limonium vulgare* Miller × *L. humile* Miller (*Statice Limonium* × *variflora*) was reported by me from Bosham, Sussex (*Journ. Bot.* 1902, 41), and agreed to by Mr. Marshall, who gathered it with me, and by Mr. C. E. Salmon.

PRIMULACEÆ.—*Primula vulgaris* Huds., *P. elatior* Jacq., and *P. veris* L. form hybrids each with the others. Mr. Marshall quotes Lloyd (*Fl. de l'Ouest*, p. 255, ed. 3) as saying of these three species and *P. variabilis* Goupil: "Ces plantes cultivées ensemble produisent des hybrides à l'infini"; but he thinks that in a wild state the hybrids are usually sterile, if not invariably. The *Polyanthus* of the garden is prolifically fertile; but though I have long grown *P. acaulis* × *veris* on light soil and heavy, I do not think seedlings have ever sprung up round these, as they do about *Polyanthus* and primrose. Mr. Druce, however, tells me that this hybrid is fertile. *Anagallis arvensis* × *cærulea* has been brought to mind recently by an interesting paper, showing much acumen, by Mr. James Edwards (*Journ. Bot.* 1906, 368), who referred to Mr. Trimmer's experiment (*Fl. Norfolk*, p. 117–118), long familiar to me; Mr. Trimmer crossed the two, and "raised a few plants which bore dark purple flowers, but yielded no perfect seed." Gaertner also crossed *A. arvensis* and *cærulea* several times, and found them absolutely sterile (Darwin, *Origin of Species*, chap. ix.). This evidence as to sterility will serve, if the hybrid should be observed in Britain.

GENTIANACEÆ.—*Gentiana Amarella* × *germanica* (*G. Pamplinii* Druce (*B. E. C. Report*, p. 379 (1892), and *Fl. Berks*, p. 345)), described from Berks specimens, and reported also by Mr. A. B. Jackson from Hants (*B. E. C. Report*, 1895, 490, and 1897, 557).

BORAGINACEÆ.—*Pulmonaria angustifolia* L. from the New Forest and *P. officinalis* L. from West Suffolk produced a hybrid in Mr. Marshall's garden at Milford; but their areas do not overlap in this country, so the hybrid cannot be expected to occur in Britain.

SCROPHULARIACEÆ.—*Verbascum Thapsus* L. has been known to cross spontaneously with *V. Lychnitis*, *V. nigrum*, and also in my garden (at Bournemouth) with *V. pulverulentum* Vill. The latter appeared to be perfectly sterile. Darwin credits the hybrids of *Verbascum* with remarkable sterility. We have two more hybrids occurring in this country, which *V. nigrum* makes with *V. Lychnitis* L. and *V. pulverulentum* Vill. Dr. Focke's testimony is on the side of sterility in this genus, instancing *V. nigrum* × *Blattaria*, *V. Lychnitis* × *Blattaria*, and *V. virgatum* × *nigrum* (artificially produced by Gaertner) as all being sterile. He mentions that Darwin found *V. Thapsus* × *Lychnitis* which he planted in his garden to be "quite infertile when left alone; but when fertilized by the pollen of a parent, it produced a few capsules with 2–5 seeds, whereas the capsules of *V. Thapsus* contained over 700 seeds." Similarly he

states that *V. Thapsus* × *nigrum* is "completely sterile; small abortive capsules occur through fertilization with one of the parents." Sterility, therefore, may be regarded as the rule in this genus. *Linaria repens* × *vulgaris* is said by Mr. Druce to be fertile.

Euphrasia. Mr. F. Townsend published the following hybrids at the close of his monograph on the genus (*Journ. Bot.* 1897, 321, &c.):—*E. Rostkoviana* × *nemorosa* Towns. (*E. glanduligera* Wettst.); *E. Rostkoviana* × *brevipila* (*E. notata* Towns.); *E. gracilis* × *brevipila* (*E. difformis* Towns.); *E. occidentalis* × *brevipila* (*E. pratiuscola* Towns.); *E. brevipila* × *scotica* (*E. venusta* Towns.); and *E. scotica* × *gracilis* (*E. electa* Towns.). The Rev. E. S. Marshall adds, from Mr. Townsend's MS. note-book, *E. brevipila* × *curta*, from Carnarvon, Kincardine, Aberdeen, W. Inverness, &c., and *E. brevipila* × *stricta*, from Carlow, Kilkenny, Dublin, Tipperary, as having been entered without a query; and believes that he has himself gathered *E. brevipila* × *foulaensis* on Ben Laoghal, W. Sutherland.

Labiatæ.—*Mentha.* In this genus we have owed so much occasional help to M. Ernest Malinvaud in determining British forms, and not least by his brief paper in this Journal (1900, 171), that I feel I cannot do better than present his views here, to which I am more or less prepared to assent. With him there are five cardinal species, viz., *M. rotundifolia* Huds., *M. longifolia* Huds., *M. viridis* L., *M. aquatica* L., and *M. arvensis* L.; he omits *M. Pulegium* L. as a distinct genus or sub-genus. *M. rotundifolia* and *M. longifolia* cross freely in France; *M. viridis* crosses with *M. longifolia* too, and we have the resultant in gardens and ground that has gone out of cultivation. "A portion of its characteristics is found in *M. rubra*, *M. piperita*, *M. gentilis*, &c." *M. aquatica* crosses on the one hand with *M. longifolia*, giving us *M. pubescens* Willd. and on the Continent some allied forms; and on the other with *M. arvensis* L., producing the *M. sativa* group. I should have been inclined myself to range *M. gentilis* under this latter combination, and also *M. pratensis* Sole. Hybrid mints are usually sterile, probably always; and owe their extension and permanence to the strong underground suckers they freely send out. To this we may attribute a certain stability of character, greater than we should expect in plants of hybrid origin, which has led to certain hybrid forms passing so long for species.

Scutellaria galericulata × *minor* I believe is sterile.—*Stachys palustris* × *sylvatica*, long known as *S. ambigua* Sm.—*Lamium hybridum* × *purpureum*, which I have been inclined to take as identic with *S. decipiens* Sond. There is, however, a form of *S. purpureum* with more deeply-cut leaves which is not the hybrid; and I do not feel positive which is *S. decipiens*.

(To be concluded.)

FORMS OF *SALSOLA KALI*.

By C. E. Salmon, F.L.S.

In this Journal for 1904, p. 26, Mr. G. C. Druce mentions that he found *S. Kali* var. *tenuifolia* Moq.-Tand. at Southwick, Sussex, in 1900, growing with *Atriplex rosea*, and considered that both were introduced plants. This was undoubtedly the case as to the latter, which was found there many years ago (see Arnold, Fl. Suss. 67, 1887), but Mr. T. Hilton, who accompanied Mr. Druce when the plants were found and knows every inch of the coast between Shoreham and Brighton, thinks the localities are confused in Mr. Druce's notes. *A. rosea* grew near the harbour, Shoreham, amongst rubbish, and has since disappeared; but the *Salsola* occurred in quite a different spot, and was not associated with aliens or other rubbish-heap undesirables.

As I wished to see more of the plant than dried examples offered, I paid a visit to the locality in August last with Mr. Hilton and Rev. E. Ellman. We were pleased to find the variety mentioned by Mr. Druce growing in some plenty with the type, from which it appeared to differ in being softer to the touch, in its long slender leaves (an inch or more), and in being apparently uniformly glabrous or nearly so. There seems no reason whatever to doubt its being just as much a native as the *Atriplex laciniata* with which it was associated in sandy ground.

It is not easy to find a satisfactory name for the specimens gathered, owing to the divergence of opinion existing in books.

Looking up first Mr. Druce's suggested name, "Var. *tenuifolia* Moq.-Tand.," the original description in DC. Prodr. xiii. part 2, 188 (1849), is as follows: "Suberecta, aspera aut glabra, viridis, foliis longis tenuibus subfiliformibus, alis brevibus pallide roseis—Folia interdum 4 poll. longa." This diagnosis does not seem to fit our plant very satisfactorily, as the leaves, though narrow, can hardly be called "subfiliform," but it fits uncommonly well the plant distributed by the Watson Exchange Club in 1900, and recorded in the 1899–1900 Report, p. 18, as "*S. Kali* L. var. *Tragus* DC. Waste ground west of the Docks, towards Hessle, Hull, E. Yorks, v.-c. 61. Identified at Kew. Oct. 1899. C. Waterfall."

The original description of *S. Tragus* L. (L. Sp. Pl. ed. ii. 322 (1763)), "foliis spinosis lævibus," agrees with the Sussex plant; it is placed by Moquin under his *S. Kali* Ten. *β Tragus*—"sub-erecta glabra viridis, alis subbrevibus subroseis vel roseis (*S. Tragus* L.).—Interdum alæ dilatatæ et brevissime in eodem caule (var. *mixta* Koch)."

The common form of *S. Kali* in Britain appears to be scabrid. Syme (Eng. Bot. ed. 3, viii. 4) says, "Plant (in the form which occurs in Britain) with the stem and margins of the leaves clothed with cartilaginous spreading hairs"; Hooker says (Stud. Fl. 343), "pubescent or scabrid"; and Babington (Man. 351), "minutely hairy." This would seem to be the *S. Kali* Ten. *α hirta* Ten.

(Moquin, *l. c.*), "procumbens vel ascendens hirta aspera viridescens, alis dilatatis vix coloratus. (*S. Kali* L.)"

Grenier & Godron (Fl. de France, iii. 32) complicate matters by retaining *S. Tragus* L., and placing under it *S. Kali* γ *tenuifolia* Moq.

Reichenbach (Fl. Germ. Excurs. iii. 583, 1832) may be consulted as to the forms of *S. Kali*, and also Koch (Syn. Fl. Germ. et Helv. ed. 3, ii. 521, 1857), who bases his varieties upon differences in the perigonium, and ignores hairiness or leaf form.

Richter (Pl. Europ. ii. 165, 1899) gives the following synonymy for *S. Kali* L. var. *Tragus* (L.). Moq. :—

S. Tragus L. Spec. Pl. ed. ii. p. 322 (1763).
S. spinosa Lam. Fl. Fr. iii. p. 240 (1778).
S. Kali f. *glabra* Dethard. Consp. Fl. Megalop. p. 25 (1828).
S. Kali β *brevimarginata* Koch, Syn. Fl. Germ. ed. ii. p. 693 (1844).
S. controversa Todaro, Fl. Sic. Exs. n. 1088.
S. Kali β *calvescens* Gren. et Godr. Fl. Fr. iii. p. 31 (1855).
S. Kali b. *marginata* Celak. Prodr. Fl. Böhm. p. 155 (1871).

The extensive distribution given does not include Britain, but embraces France, Holland, and Germany.

This note may call attention to the fact that *S. Kali* is a plant that shows interesting variations, and I hope that British botanists, when gathering Salicornias (to which a good deal of attention has been given lately), will not omit to examine and report upon the neighbouring Salsolas.

S. Kali var. *Tragus* will probably be found to occur in other places upon our shores and in various herbaria.

SHORT NOTES.

Gymnadenia × Le Grandiana G. Camus.—In this Journal for 1899 (p. 360) I drew attention to a plant found by me on the chalk escarpment north of Sevenoaks, which appeared to Mr. F. J. Hanbury, as well as to myself, to be a hybrid between *Gymnadenia conopsea* and *Orchis maculata*. In the Journal for 1902 (p. 297) the Rev. E. F. Linton mentions specimens in his herbarium from Bangor and Oswestry which he identifies with this hybrid. I am also informed that a similar plant has been found in the extreme north of Scotland, the *Orchis* parent in this case being *O. maculata* subsp. *ericetorum* Linton. This year, having obtained three specimens of the Sevenoaks plant in a living state, I took them to the Botanical Department of the British Museum, where I was enabled to consult what had been published on the subject. The plant was described and named by M. E. G. Camus in Bull. Soc. Bot. de France, xxxvii. 215 (1890), in an account of plants found by him at Neuvy-sur-Barangeon (Cher), almost in the centre of France. He describes two new hybrids, one being × *Orchis Sausàiana* (*O.*

coriophora × *O. latifolia*) and × *Gymnadenia Le Grandiana* (*G. conopsea* × *O. maculata*). The following is a translation of his description of the latter: "Discs of the pollen-masses free, not enclosed in a pouch. Tubercles of the root two-lobed. Stem slender, leafy, two decimetres in height, not hollow. Leaves linear-lanceolate, somewhat channelled above, obscurely spotted only at the top; bracts reddish, one-nerved, about as long as the ovary. Flowers few, in a short spike, lilac-coloured. Upper perianth-leaves equal, lanceolate-acuminate, the two lateral ones patent, ascending, not spotted. Lip oblong, three-lobed, the middle lobe entire, rather longer but narrower than the lateral lobes, with streaks and spots symmetrically arranged. Spur filiform, at least as long as the ovary, and pointing downwards. Plant exhaling a faint odour of vanilla." The Sevenoaks plant, if some allowance is made for the well-known variability of hybrids, agrees fairly well with the above description. The number of flowers and length of spike obviously depend on the luxuriance of the individual; the lateral sepals are usually rather horizontal than ascending, and are spotted. The ground colour of the flower resembles that of *G. conopsea*, the markings being only slightly darker. The spur is certainly much less filiform than in *G. conopsea*, and I have found no trace of free nectar. The odour is that of *G. conopsea*, but somewhat fainter, and under some conditions hardly perceptible. The whole upper surface of the leaf is spotted, but more faintly than is usual in *O. maculata*. It may be of interest to note that the viscid matter of the discs seems hardly fluid enough to insure the easy removal of the pollen-masses. This is not surprising, as it is not protected by a pouch, as in *O. maculata*, and is much more exposed than in *G. conopsea*. The ovaries readily swell if pollen, even that of *Habenaria chloroleuca*, be applied, but I cannot say whether good seed was formed. I am persuaded that a careful search in places where both parents occur would often be rewarded by finding the hybrid, and possibly this remark applies also to the hybrid between *G. conopsea* and *O. latifolia*, which is found on the Continent.—HENRY PEIRSON.

[Mr. Peirson's specimen, with enlarged drawings of the flowers, is exhibited in the public gallery of the Department of Botany.—ED. JOURN. BOT.]

CEPHALOZIELLA PATULA (Steph.) Schiffn. IN BRITAIN. — When botanizing in Crete in the spring of last year I gathered a *Cephaloziella* with abundant perianths, which Prof. Schiffner kindly identified for me as *C. Baumgartneri* recently described and figured by him in Verh. der K.K. Zool.-Bot. Ges. in Wien, 1906, p. 273. Prof. Schiffner has subsequently shown (in Oesterr. Bot. Zeit. 1907, 48) that this species is the same as *Cephalozia patula* Steph. in Bull. Soc. Bot. Ital. 1905, 210, and this latter specific name consequently has the priority. Shortly after I had received this identification, I gathered an hepatic on a very familiar part of the chalk downs close to Lewes which appeared to be identical with the *Cephaloziella* from Crete, and which identity Mr. S. M. Macvicar

and Prof. Schiffner himself have since fully confirmed. It is a little curious that I should have first gathered in Crete a plant which grows within ten minutes' walk of where I have lived for years. *C. patula* is closely allied to *C. integerrima* (Lindb.) Warnst., recently recorded as British by Mr. S. M. Macvicar (Journ. Bot. 1907, 66), and like that species has very highly connate bracts. It differs from it, however, in the larger and generally more incrassate cells, the more pointed lobes of the leaves, and in the more pointed and more frequently denticulate perichætial bracts. The margin of the leaves and bracts is, moreover, always erect in *C. patula*, while it is not infrequently recurved in *C. integerrima*. *C. patula* appears to be a truly calcicolous plant, and generally reaches its best development near Lewes when growing directly on blocks of chalk, and it has its headquarters in the Mediterranean regions, where it is widely distributed. *C. integerrima*, on the other hand, grows on damp clay or sand, and although it has been found as far south as Italy it appears to have its headquarters in northern Europe, being recorded from several localities in Scandinavia. In the original description, *C. patula* is said to be dioicous; while Prof. Schiffner describes his *C. Baumgartneri* as pseudo-dioicous, a term which he uses to cover those cases where a monoicous plant, by the subsequent separation of the male and female stems, presents the appearance of being dioicous. I found comparatively little difficulty in proving the Lewes plant to be monoicous by examining young material in the autumn, but when the young perianths are fully formed in the spring, the character becomes more difficult to ascertain. *C. patula* will probably be found over a considerable part of the chalk and limestone districts of the South and West of England where suitable conditions occur. The locality near Lewes is a steep estuarine cliff, where the solid chalk protrudes here and there through the turf. It is associated here with *Seligeria calcarea*, various species of *Weisia*, and *Lophozia turbinata*. In Crete, where it grew on the limestone, it was generally associated with *Weisia calcarea*, *W. verticillata*, *Lophozia turbinata*, and *Mesophylla stillicidiorum*.—Wm. Edwd. Nicholson.

Ononis reclinata L. in Glamorgan.—Through the courtesy of Professor Seward we have had an opportunity of looking through a number of letters addressed to the late Professor Babington by various botanists and others, which are preserved in the Botany School at Cambridge. Among them is one from Joseph Woods, dated December 1855, in which the following passage occurs :—"I find on looking over my plants that I have a specimen of *Ononis reclinata*, gathered at Port Eynon many years ago." Woods's herbarium came into the possession of the late Mr. Frederick Townsend, who bequeathed it to Mr. Hume for the Botanical Institute which he is proposing to establish in South London. Mr. Hume has kindly lent us the specimen in question. It is labelled "Ononis," "on rocks at Port Eynon, Glamorganshire, 18 Sept. 1828" to which Woods has added, "reclinata?" the collector's name, "D. Sharpe," and the following note :—"Cal equal Corolla-segments

lin. lanc. subacute. Stalk shorter than L. without marked difference in upper part & without Bract or Awn. L. obov° cuneata. Stip. obscurely dentate. Leg. equal Calyx I think this rather to be *mollis* though the seeds are somewhat different." When he wrote to Babington, Woods had evidently come to the conclusion that the plant was *O. reclinata*. The specimen is an unusually branched and spreading one, and the calyx is rather longer in proportion to the pod than in most of our specimens, but we do not feel any doubt that it is correctly referred to *O. reclinata*.—H. & J. Groves.

Hypnum riparium L. in New Zealand.—Sir J. D. Hooker (Handb. New Zealand Flora, p. 482, footnote) writes: "The European *H. riparium* is stated (Fl. N. Z., ii. 109) to be possibly a native of New Zealand from very imperfect specimens collected at Hawkes Bay by Colenso. I do not now find the specimens, which were very small and incomplete, and I think that the identification is better suppressed." The occurrence of *H. riparium* in New Zealand has apparently not been confirmed since; Paris (*Index*) does not include New Zealand in its distribution; while Cardot (*Mousses de l'île Formose*, 1905) gives the distribution thus: "Toute l'Europe et l'Amérique du Nord. Asie: Japon, Tonkin, Thibet. Afrique: Algérie et îles atlantiques. Indiqué aussi en Australie, à Cuba et à l'île Kerguelen." It may therefore be interesting to record its collection in November, 1905, on mud at the bottom of a creek, alt. 800 ft., near Hunterville, north of Marton, North Island, by Mr. Chas. J. Burgess. It was sent me by Mr. W. H. Burrell, with some other New Zealand mosses from Mr. Burgess, and, though the nerve is rather weak for *H. riparium*, there can be no doubt of its identity. It is one of the aquatic forms, resembling var. *longifolium* Schimp., except in the less finely acuminate leaves; possibly var. *elongatum* B. & S. There are specimens in the Herb. Mus. Brit. from Swan River, Australia, coll. Drummond, and from Kerguelen Land.—H. N. Dixon.

Seed-dispersal in Euphorbia Chamæsyce L.—Kerner, in his *Natural History of Plants*, gives *Euphorbia* as an example of a genus in which the seeds are forcibly expelled, but I do not know if the process has been noted in the smaller species of the genus. *E. Chamæsyce* is a small prostrate annual very closely allied to our *E. Peplis*. I grew it last year in my garden, from seed of specimens gathered in 1904 by the Amphitheatre of Verona. Wishing to collect some seed for sowing, I brought a plant or two indoors and placed them on a table with their roots in water, and next day found the seeds and capsule-valves strewn for some distance round the plants. Observation showed that this was due to the expulsive action of the capsular walls, and I found on measurement that the seeds reached distances varying from fourteen to twenty-five inches. As the seeds are extremely small and light, measuring just 1 mm. in their longest diameter, the whole capsule rarely exceeding 2 mm. in diameter, this implies a high degree of mechanical energy, taking into account the size of the structure involved; the more so

as, in the conditions obtaining, the plant was probably considerably less vigorous than it would be when undisturbed and in its normal habitat.—H. N. Dixon.

Ecology of Montia fontana (p. 211).—In Mr. Riley's note on this plant, the kind of habitat is excellently described, and I might add that in the very many situations where I have seen it in numerous counties, when growing well, it always occurs in very well-aerated watery places. Mr. Riley, however, says:—"The factors, therefore, which seem to be necessary for the growth of this plant appear to be a spongy *bog* with a very slight trickle of water." *Montia* does not grow in *bogs*.—Wm. West.

Ophrys muscifera var. virescens.—A living specimen of a clear green variety of the Fly Orchis has been given to Kew by Mr. H. Walker, 2, Brownswood Park, Green Lanes, N. It was found in a small copse at Wye, near Ashford, Kent, by Mr. G. W. Harris, the joint discoverer with Mr. Walker of the rare *Ophrys hybrida* Pokorny in Britain two years ago. In the normal form of the species the antennæ-like petals and the entire lip, with the exception of a white glaucous blotch in the centre, are dark purple; but in the variety this pigment is entirely suppressed, leaving these organs light emerald-green in colour, rather more yellow than the sepals, which are in their normal green state. There are parallel cases in *Odontoglossum* and other genera, where the suppression of dark brown markings leaves the flower yellowish green in colour, and these forms remain constant from year to year. In this case the peculiarity is probably permanent, and as the tuber has been left it may be possible to ascertain this next season. The variety seems exceedingly rare, only a single record having been discovered; this relates to a greenish form recorded as having been found in Switzerland by Hegetschweiler (Fl. der Schweiz, p. 874). The Wye specimen is preserved at Kew, together with a coloured drawing of it.—R. A. Rolfe.

NOTICES OF BOOKS.

The Dillenian Herbaria: An Account of the Dillenian Collections in the Herbarium of the University of Oxford together with a Biographical Sketch of Dillenius, Selections from his Correspondence, Notes, &c. By G. Claridge Druce, Hon. M.A., Curator of the Fielding Herbarium. Edited, with an Introduction, by S. H. Vines, M.A., F.R.S., Sherardian Professor of Botany in the University. Oxford: at the Clarendon Press. 1907. 8vo, front., pp. cxii, 258. Price 12s. 6d.

The contents of this excellently-printed volume are sufficiently indicated by the title-page here transcribed; but this, full as it is, gives an inadequate notion of the trouble and care which has been spent upon the book. Of this the lion's share—as indicated by Prof. Vines in the interesting introduction in which he gives an estimate of the work of Dillenius and of the place which he occupies

in the history of British Botany (or more accurately of Botany in Britain)—has fallen to the lot of Mr. Druce, who, with characteristic industry, has throughout given the modern synonymy of the plants mentioned by Dillenius in his correspondence or described in his published works, as well as of the plants preserved in the University Herbarium: this must have involved a vast amount of labour and seems on the whole to be very carefully done. He has also indicated what appear to be "first county records"—a matter for which compilers of county floras will be grateful to him, although it might perhaps have been left to them in the first instance. If, indeed, the book is open to criticism, it is on the somewhat uncommon ground that it contains too much rather than too little; *e. g.* we cannot but regret that Mr. Druce has been unable to resist the temptation which so easily besets him, and has taken the opportunity to publish a number of new combinations, some at least of which cannot stand.

The earlier portion of the book, after an excellent biography with notes, contains a hitherto unpublished account of a journey from London to North Wales in 1726, selections from MS. descriptions of British plants, and copious extracts from Dillenius's correspondence, including the letters to Samuel Brewer preserved in the library attached to the National Herbarium, to which attention has more than once been called in these pages, and letters from Littleton Brown, Richardson, and Haller. Mr. Druce refers to but does not describe six letters in the Sloane MSS. addressed by Dillenius to Sloane, Scheuchzer, and Brewer; he will find one to Peter Collinson in *Hortus Collinsonianus*, p. 35.

The identification of the plants in Dillenius's (the third) edition of Ray's *Synopsis* follows the correspondence; in this Mr. Druce acknowledges the help of specialists, but the bulk of the work so far as the phanerogams is concerned is his own. The identifications are of course based on the Dillenian herbarium, except for the fungi, which are not represented therein; these are named from Dillenius's drawings. It is in this part of the work that we find the new combinations to which we have referred, some of which we think have been printed without due consideration. For example, on p. 115 we find five new combinations under *Helleborine*—a name adopted for *Epipactis*, as Mr. Druce informs us by letter (there is no explanation in the book) on the supposition that Hill employed the name for the genus as restricted by post-Linnean authors. But a reference to the *British Herbal* (p. 477) shows that Hill merely restores the name for the plants to which Linnæus applied the name *Serapias*—"he takes away the received name and calls it *serapias*," are his words; and although it happens that the British species described by Hill all belong to the group subsequently segregated as *Epipactis*, Hill had no intention of so restricting it, but used it as synonymous with the original *Serapias* of Linnæus. This is the more apparent because when Hill intended to differ from the Linnean conception of a genus he made his intention perfectly clear—thus under *Radiola* he says "Linnæus makes this a species of *linum* or flax, though it con-

tradict the whole generical character." It seems a pity to have retained and so to have given further currency to the untenable name *Kœleria splendens* Druce (see Journ. Bot. 1906, 104), and it might have been mentioned that the unpublished engraving was reproduced in this Journal for 1905, t. 474. But as a whole there is much to admire in the thoroughness and care with which Mr. Druce has executed this part of the work, and British botanists will find it valuable as a means of connecting pre-Linnean nomenclature with that now in use.

The plants of the *Hortus Elthamensis* are next identified: we note that the "Spermacoce verticillis globosis" from the Gambia which is here assigned to *S. verticillata*, is more generally referred to *S. globosa* Schum. & Thonn. (see Fl. Trop. Afr. iii. 240 and Bull. Herb. Boiss. 1907, 379, where Mr. F. N. Williams says it "is the first plant from the colony to have been put on record"). Finally we have an identification of the herbarium of the *Historia Muscorum*—algæ, mosses, lichens, &c. Of this work the original drawings are in the National Herbarium, except the last six, two of which are only represented by proofs, while four, as a note in the volume tells us, were "not drawn but were etched and engraved immediatly upon y^{e} copper plates." Mr. Druce says (p. xxxv) "The original drawings were said to be among Sir Joseph Banks's collection, but see note 27," which states that they were "bought at the sale of Robert More." There is no discrepancy in the two statements, as the volume was bought by Banks at More's sale and became no. 56 of his collection of MSS.

The book concludes with an index of the names of the plants mentioned; there is no list of the various persons referred to, and its absence constitutes the only defect in the volume. We are surprised that the Clarendon Press should have omitted so important a feature in a book of which the biographical interest constitutes an important portion of the usefulness and value. Such an index is the more necessary because the table of contents is, for a work of the kind, regrettably meagre.

Cytological Studies in Cyanophyceæ. By Nathaniel Lyon Gardner. University of California Publications. Botany. Vol. ii. No. 12, pp. 237–296, plates 21–26. November 10, 1906.

In the hope of discovering some clue to the origin of the cell-nucleus, cytologists have lately manifested much interest in the *Cyanophyceæ*, there being a controversy as to the presence of a nucleus, its structure and functions, as to the structure of the cytoplasm, the presence of chromatophores, and the nature of the granules. In his recently published *Cytological Studies in Cyanophyceæ*, Dr. N. L. Gardner has done much towards settling these contested questions, and to this end he collected and studied over one hundred species of *Cyanophyceæ*. One of the chief difficulties which he had to overcome was the elimination of the sand that adheres to these small algæ; and the various methods by which he effected this he describes in detail, as well as the methods of killing,

fixing, and staining which he found to be the most successful. By prolonged experimentation he at last discovered a method of differentiating by staining-reagents the granules from the chromatin, thus avoiding what had been a source of much confusion to previous authors. The very best differential chromatin-stain proved to be Ehrlich's hæmatoxylin, freshly prepared, made from Grübler's hæmatin. With this it is possible to stain the chromatin without affecting the granules.

An excellent summary and digest of previous work on *Cyanophyceæ* cell-structure is given, special attention being devoted to the recently published views of Kohl, Phillips, and Olive. A brief comparative analysis of the conflicting conclusions of these authors on the respective points at issue is added. The lack of unanimity in their results is shown by Dr. Gardner to be due to their failure to differentiate the structures present in the cell, and their eagerness to recognize a complicated mitotic nuclear division. Dr. Gardner's own study of the protoplast of the *Cyanophyceæ*-cell has convinced him of the constant presence of the following three structures: (1) a cell-nucleus more or less sharply delimited; (2) the cytoplasm, extending from the nucleus to the cell-wall, and containing (3) the granules. He treats of each of these structures in detail. The nucleus, being large, has its shape influenced by that of the cell. And the author shows that in the *Cyanophyceæ* a series of nuclear structures is revealed—passing by very gradual steps from a simple scarcely differentiated form of nucleus, which divides by simple direct division, up to a highly differentiated form, which in dividing shows a primitive type of mitosis, and approximates in structure to the nucleus of the *Chlorophyceæ* and the higher plants. A new type of nuclear division has been discovered by Dr. Gardner in *Dermocarpa*, in which the nucleus breaks up simultaneously into a large number of daughter nuclei by a process of amitosis. Cell-division is completed in the filamentous forms by the gradual ingrowing of the ring-shaped cell-wall. In some cases the division of the chromatin seems to precede the ingrowing of the cell-wall; in others it accompanies and keeps pace with it; and in still others it is, as it were, passively constricted and cut in two by the ingrowing cell-wall. In its structure the nucleus consists of granules, chromatin, and an achromatic ground substance in which the two former substances are imbedded. The author demonstrates two kinds of granules in the cell—one associated with the chromatin in the nucleus, and never found in the mature spore; and the other (probably food material) often present in the vegetative cell, but always present in the mature spore. One of the products of assimilation is glycogen. No definitely organized chromatophore is found, the cytoplasm holding the colouring matters. No protoplasmic continuity between the vegetative cells appears to exist.

It is impossible in so limited a space to render an adequate account of the results set forth by Dr. Gardner in this important and illuminating addition to our knowledge of the minute structure of the *Cyanophyceæ*.

A. & E. S. G.

BOOK-NOTES, NEWS, &c.

At the Anniversary Meeting of the Linnean Society on May 24 —the two hundredth anniversary of the birth of Linnæus—the Secretary laid before the meeting a copy of a letter from Linnæus to Professor Pietro Arduino at Padua, with an introduction by Dr. G. B. De Toni, and a paper by himself on a MSS. List of the Linnean Herbarium prepared by Linnæus in 1753–5 with a Catalogue of the genera now existing in the Herbarium. The Linnean Medal was awarded to Dr. Treub, of the Buitenzorg Garden.

At the meeting on June 6, Dr. Carruthers, the representative of the Society at the recent Linnean celebrations in Sweden, gave an account of the proceedings, beginning on the 21st May at Lund, the excursion by special train to Råshult, the return to Elmhult for supper, the further journey south to Hessleholm to meet the train from Malmö, and the subsequent night journey to Stockholm and Upsala. Next he described a special journey to Linné's Hammarby with his travelling companion Mr. B. Daydon Jackson, and Lieut.-Colonel Prain. The events of the two following days were set out, including the celebration in the Aula of the Upsala University, where he presented the Linnean Gold Medal and the Society's Address. On Friday, the 24th, the University conferred various degrees upon the distinguished visitors; the botanists honoured were Mr. Carruthers, Mr. B. D. Jackson and Mr. F. Darwin, who were created Doctors of Philosophy: a laurel crown, made of leaves from a bay-tree planted by Linnæus, was placed on the heads of the newly appointed doctors. Mr. Jackson also received the Order of the Polar Star. Early on Saturday the delegates left for Stockholm, but the special train was too late to permit of the Bergielund Botanic Garden being visited; at two the event of the day took place at the Kungl. Musikaliska Akademi, where Count Mörner, President of the Kungl. Svenska Vetenskaps Akademi, after eulogising Linnæus, spoke in English and announced that the Bicentenary Medal of the Academy had been awarded to Sir Joseph Hooker.

On Friday, 7th June, the President and Council held a reception in the rooms of the Society. Nearly three hundred guests were present, amongst them being His Excellency Count Wrangel, the Swedish Minister, and other members of the Legation, and several Swedish visitors. A special feature of the exhibition was a display of manuscripts, books, personal relics, medals, &c., of the great Swedish naturalist, which belong to the Society.

In connection with the Linnean Bicentenary an exhibition has been arranged in the Central Hall of the Natural History Museum, comprising an interesting series of portraits of Linnæus, a number of autograph letters and original MSS., together with specimens of animals, plants, and books from his own collection at the Linnean Society and the Department of Botany.

We beg to offer our respectful congratulations to Sir Joseph Hooker on the completion, on the 30th ult., of his eighty-ninth

year. Sir Joseph, we are glad to know, is in the enjoyment of excellent health and is still at work.

Herr Dörfler (III Barichgasse 36, Vienna) has issued two more fascicles of the admirable series of *Botaniker Porträts*, of which we last year commended the earlier instalments. Nothing could be better than these reproductions, printed as they are on card with facsimiles of signature, and accompanied by a short but excellent biography. Each fascicle (of ten) costs 5 marks; single portraits cost 1 mark each. The third part contains two of Rudbeck, four of Linnæus (with facsimile of his writing), Haller, Scopoli, N. J. Jacquin, and Allioni; the fourth, Wulfen, Ingen-Housz, Hedwig, Gaertner, Kölreuter, Schreber, Pallas, Ehrhart, Thunberg, and Lamarck. The excellence of the work is as remarkable as its cheapness.

Messrs. Routledge send us an extremely pretty little *Garden Anthology*, beautifully printed, elegantly got-up, and of just the size for the pocket. The selection of extracts, in prose and verse, many from unhackneyed sources, made by Miss Rose Gardner, is so good that one is sorry it is not better; but there are serious omissions—*e. g.* there is nothing from Mr. Robert Bridges, although some of his verses, such as "The pinks along my garden walks," are eminently fitted for inclusion; while we could well have spared such early Victorian affectations as "Dora Waiting," by Mrs. Meredith, better known by her maiden name (Louisa A. Twamley) under which she published much verse, some of it quite pretty. The appearance of the book is slightly marred by placing "by permission of," &c., at the foot of so many extracts; the usual method of acknowledging these *en bloc* in the preface is to be preferred. But the book is cheap at half-a-crown, and will give pleasure to many garden-lovers when the weather will not allow them to enjoy their gardens. There is a curious misprint on p. 125, where "Nowhere" should read "Now here."

Messrs. Dulau and Co. publish a shilling volume of *Lectures to Sugar Planters*, containing a summary of seven lectures "delivered by the officers of the Imperial Department of Agriculture at Barbados seven years ago." They deal with the natural history and cultivation of the sugar-cane, and its insect pests and fungoid diseases. Three are by Prof. J. P. D'Albuquerque, and one each by Sir Daniel Morris, and Messrs. J. R. Bovell, H. Maxwell-Lefroy, and A. Howard.

The new edition of the late Rev. M. H. Arnold's *Flora of Sussex*, which we mentioned (Journ. Bot. 1906, 289) as in preparation, has appeared, and realizes the forebodings we then expressed as to its unsatisfactory nature. As we pointed out (*op. cit.* 135) when criticizing his contribution to the Victoria County History of Sussex, Mr. Arnold had in no way kept himself *au courant* with our knowledge of the botany of the county, and this is evident throughout the new edition of his Flora. With competent editing it might have been made a useful book; as it is, it can only be regarded as a prelude to a satisfactory Flora of the county. In the

short prefatory note written just before his death, Mr. Arnold, we think rightly, protests against "the growing practice" of including casuals in our lists; but when he adds, "I exclude them altogether," one wonders why such things as *Melilotus parviflora* and *Brassica monensis* have been added to this edition, and why *Thlaspi perfoliatum* is retained on the faith of an introduced specimen from Newhaven in Borrer's herbarium. There are numerous omissions—e.g. *Vicia gracilis* and *Chenopodium hybridum*—and many strange entries—e.g. *Ranunculus intermedius* and *R. lutarius* appear as two species, as do *Malva borealis* and *M. pusilla*; "*Fumaria Boræi* var. *Boræi*"; *Montia rivularis* is "rapidly becoming naturalized." The Appendix, showing in tabulated form the non-Sussex species that occur in Hants, Kent, and Surrey, is absolutely useless, as no attempt has been made to bring it up to date since 1887. It is much to be regretted that the Miss Arnolds, who have produced the book, did not submit the proofs to some botanical expert; the three plates contributed by one of them cannot be considered satisfactory. The book (pp. 154) is published by Messrs. Mitchell & Co., Arundel, price (to subscribers) 4*s*. 6*d*.

Alexander Somerville, who died at his residence at Hillhead, Glasgow, on June 5, was born in that city in 1842. After a business career in Glasgow and Calcutta, he returned to Glasgow and graduated B.Sc. at the University. His love for natural history led him to take up the study of the mollusca, after which he turned to botany, to which he devoted himself with much energy, especially in its topographical aspect. He conducted botanical classes for ladies, and had a large herbarium; he was an amiable and generous correspondent, and sent out admirable specimens. Most of Somerville's work was published in the Transactions of the Glasgow Natural History Society, in which body he took much interest and was at one time president; other papers appeared in the Transactions of the Botanical Society of Edinburgh, and notes from his pen will be found in this Journal; he was treasurer of the Watson Botanical Exchange Club from 1900 until his death. He became a Fellow of the Linnean Society in 1881.

Sir Dietrich Brandis, whose important volume on *Indian Trees* we noticed on p. 36, died at Bonn (where he was born on March 31, 1824) on the 28th of May. He was educated at the Universities of Copenhagen, Gottingen, and Bonn, and in 1856 was appointed Superintendent of Forests in Pegu; prior to this he had published papers on strychnine and other subjects in German periodicals. From 1864 to 1883 he was Inspector-General of Forests to the Indian Government. His work, he tells us in the book already referred to, was purely practical, and never left him "leisure for collecting systematically or for working out scientific problems"; nevertheless, by his knowledge of the literature of the subject and of the material accumulated by others, he was enabled to produce the volume which may be looked upon as his most important memorial, as, apart from his official reports, he did not contribute largely to botanical literature. He became a Fellow of the Linnean Society in 1860 and was knighted in 1887.

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THE

JOURNAL OF BOTANY

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CONTENTS

PAGE

The Genus *Cratægus* in North America. By Prof. C S. Sargent, F.L.S. 289

Plants of E. Perth and S. Aberdeen. By Rev. E. S. Marshall, M.A., F.L.S., & W. A. Shoolbred, F.L.S. 292

Hybrids among British Phanerogams. By the Rev. E. F. Linton, M.A. (concluded). 296

Note on *Rosa hibernica*. By James Britten, F.L.S. 304

Short Notes.—Fertility of *Senecio albescens* (*S. Cineraria* × *Jacobæa*) —Ecology of *Montia fontana* L. —*Phleum pratense* L. var. *præcox* Jord.—The *Koeleria* of Ben Bulben.—*Schœnus nigricans* L. 306

Notices of Books:—

Der Einfluss des Klimas auf den Bau der Pflanzengewebe. Von Dr. Carl Holtermann. 307

Lectures on Plant Physiology. By Dr. Ludwig Jost. Translated by R. J. Harvey Gibson, M.A., F.L.S. 310

Book-Notes, News, &c. 311

Supplement.—A Flora of Glamorganshire. By H. J. Riddelsdell, M.A. (continued).

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THE GENUS *CRATÆGUS* IN NORTH AMERICA.

By Prof. C. S. Sargent, F.L.S.

Fifteen years ago American botanists recognized fourteen species and a few supposed varieties of North American *Cratægus*. These, with a few exceptions, had been described in Europe, and chiefly from cultivated plants; and the arrangement of the species published in 1838 by Torrey and Gray in their *Flora of North America* has been practically adopted in subsequent publications on the American flora. In 1882 Engelmann, however, described *C. brachyacantha*, a blue-fruited species of Louisiana and Texas, first collected many years earlier by Drummond; in 1892 Chapman described two species which he had found at Rome, in northern Georgia; and in 1896 Green published his very distinct *C. saligna* of the Rocky Mountains. About this time our interest at the Arboretum in the genus was roused by the fact that plants raised here from seeds collected in various parts of the country differed constantly from any of the described species. It was soon seen that different plants which it had been supposed belonged to one species differed in their time of flowering, in the number of their stamens, in the colour of their anthers, in the time of the ripening of their fruit, and in the nature of the fruit and the form of the nutlets, and that these characters were constant and could be depended on as distinguishing characters.

Following up the investigation, it was found that these seedling plants in the Arboretum were identical in all these characters with the wild plants from whose seeds they had been raised. These facts led to a more careful study of the genus in several States, with the result that about five hundred species have been described in the last eight years. It is not surprising that botanists, looking at the genus through the eyes of Torrey and Gray, or reaching their conclusions from the study of the scanty and generally incomplete material found in herbaria, have regarded the makers of all these species with pity, and have tried to throw ridicule on this investigation and its results. To those persons, however, who examine the plants in the field even casually, the fact is soon apparent that the genus contains many very distinct forms, whether these are to be called species or not.

These distinct forms or species fall into twenty natural groups, and the plants of these groups can be recognized at a glance. For botanists with broad ideas in regard to the limitation of species the twenty groups may represent twenty species, under each of which can be grouped a number of subspecies and varieties, while other botanists may consider it more convenient to treat all distinct forms as species. The *Pruinosæ* group, based on a cultivated plant described by K. Koch in 1854, and until recently entirely overlooked by American botanists, will serve perhaps to illustrate the varieties which are now known to occur in one of the large groups. The *Pruinosæ* are distinguished by their late-ripening, often green, sometimes angled and generally pruinose fruit, large flowers, and

long-petioled leaves sparingly glandular only towards the apex. In this group eighty species have already been described. These fall into two secondary groups: first, those having flowers with twenty stamens; and, second, those having flowers with ten stamens. The plants of these secondary groups are further distinguished by the colour of the anthers, some of the plants in each having rose-coloured or pink anthers and others pale yellow or nearly white anthers. A further subdivision is possible from the fact that some of the plants in each of these subdivisions have few-flowered corymbs and others many-flowered corymbs, and that in both the few-flowered and in the many-flowered divisions some plants have thick leaves and others thin leaves; in some of the plants with thick and with thin leaves the leaves are perfectly smooth, even when they first appear, while in others they are setose on the upper surface, in some species becoming quite glabrous before mid-summer, while in others the leaves remain scabrate throughout the season; in some species the leaves are yellow-green and in others blue-green. Characters are found also in the fruit, which in the different species is globose or short-oblong, or often broader than high, or occasionally pyriform. All such characters are constant from year to year, and so far as it is possible to judge at this time they are transmitted to seminal offspring.

The origin of these many forms I cannot pretend to account for. The theory that they are hybrids of recent origin, however, can hardly be accepted. All the forms are constantly and abundantly prolific, and the seedlings that have been raised at the Arboretum in the last few years show none of the tendencies to variation usually found in the offspring of recent hybrids. Unlike the seedlings of *Malus*, *Rosa*, and other *Rosaceæ*, the seedlings of any of these supposed species of *Cratægus* do not vary, either in foliage, flower, or fruit, and I have never seen what seemed to me to be a hybrid *Cratægus*.

It is interesting to find that the principal groups of the genus are often confined to distinct geographical sections. For example, the largest group of the north-eastern States, the *Tenuifoliæ*, does not occur in the southern States, except at high altitudes, or west of the Mississippi River. The *Flavæ* group is found only in the south-eastern States, and the *Viridis* group in the States adjacent to the lower Mississippi River, with occasional representatives in the south-eastern region. The *Pruinosæ* is mostly northern and extends to beyond the Mississippi, while the *Microcarpæ*, *Æstivales*, *Trifloræ*, and *Bracteatæ* groups are exclusively southern. On the other hand, a few groups like the *Crus-galli*, the *Punctatæ*, and the *Molles*, are widely distributed from the valley of the St. Lawrence River to Texas, while the *Tomentosæ*, which is distinguished by the longitudinal cavities on the ventral faces of the nutlets, and which is principally a northern group, extends to the Rocky Mountains and the northern Pacific States where *Cratægus* is represented by only a few species. Many of the groups, however, occupy promiscuously the same territory, and in the north especially representatives of several of them may often be found in a comparatively

small area, while individuals of allied species may frequently occur within a few feet of one another.

While *Cratægus* is certainly common in eastern North America, its distribution is by no means general. Colonies occur, as at Buffalo and Niagara Falls in New York, where in areas of a few acres fifteen or twenty distinct forms, belonging perhaps to four or five of the primary groups, grow together with many individuals, while outside of such great colonies it is often difficult to find a single plant over large adjacent regions. It is probable that the plants have largely increased in numbers since the general settlement and clearing of the country, for *Cratægus* is not a true forest plant and thrives and spreads only in open situations. That they are not more abundant and more generally distributed, and that the large colonies are frequently found on the waste ground in the neighbourhood of towns is due, no doubt, to the fact that farmers, especially in the northern States and Canada, consider the presence of thorns on their land as indicative of bad farming and cut them down as fast as they appear.

The study of the genus presents many difficulties. Herbarium specimens, unless they can be made in both spring and autumn from the same plant, and unless they are accompanied with accurate notes on the colour of the anthers, have no practical value. Many of the species look so different in the spring and in the autumn that it is essential to number carefully each plant from which specimens are taken. Collectors willing to undertake such troublesome work are not to be found in much of the vast region over which *Cratægus* is scattered; and the blooming period of the different forms which may occur in any given region may extend through several weeks, and as each species remains in flower for only a few days, such a region must be visited several times in order to secure the flowers of all the forms; while in the autumn the ripening of the fruit in any given locality may extend from August to November. Many visits have to be made, therefore, to a station before sufficient material for the description of all the forms which may occur there can be obtained, and the number of such stations that one observer can visit satisfactorily in one season is necessarily small. The difficulties are increased, moreover, by the fact that *Cratægus* does not flower every year, and that the fruit is sometimes destroyed by insects or disease. Much work has already been accomplished, but much more remains to be done. The plants growing in only a few small regions have been critically studied, and there are still thousands of square miles in the United States and Canada where *Cratægus* is known to exist, and where no systematic collections have been made. In every township of half a dozen States it is more than probable that forms exist which differ from those that have already been described, and many years will be needed to elucidate the characters and distribution of the genus in this country.

The investigation at best can only be carried on slowly and with full knowledge of all the characters of each plant described. The importance of deliberation has already been shown, and the diffi-

culty of this investigation has been immensely increased by the publication by different authors of the same plant under different names, and of nearly one hundred species based on inadequate material, which can probably never be determined. Much information about the genus and its species will ultimately be obtained, it is believed, however, by the systematic cultivation of these plants at the Arboretum, although preliminary studies must be made in the field.

Since the autumn of 1899, 2469 lots of *Cratægus* seeds have been planted here. Careful records are kept of each sowing, and herbarium specimens are preserved, taken from the plant from which the seeds of each sowing were gathered. About five hundred lots of these seedling plants have now been permanently planted out, but among these are many representatives of widely distributed species raised from seeds gathered in different localities, in order to show the existence of any variation that may occur in such species. A comparative study of these cultivated plants when they are old enough to flower and produce fruit should make it possible to distinguish the different forms, and to determine the value of the field-work which has been done in this genus.

PLANTS OF E. PERTH AND S. ABERDEEN.

By Rev. E. S. Marshall, M.A., F.L.S., & W. A. Shoolbred, F.L.S.

These notes are the outcome of a week's work at Blairgowrie (E. S. M.), a week at the Spittal of Glen Shee, and nearly a fortnight at Braemar in July, 1906. In such well-worked districts we could not expect to find many novelties, apart from critical forms; for help in working out these we are indebted to Mr. Arthur Bennett, Rev. E. F. Linton, Rev. W. R. Linton (who saw most of the hawkweeds), Rev. A. Ley, and others. Supposed new vice-comital records are starred. 89 = E. Perth; 92 = S. Aberdeen.

Ranunculus Drouetii F. Schultz. 89. The plant at New Mill, Lunan Burn, mentioned in *Fl. Perth.* is not this species, but *R. heterophyllus*, which also occurs in Fingask Loch. — *R. Lingua* L. 89. Stormont Loch; locally abundant.

Radicula Nasturtium-aquaticum Rendle & Britten var. *siifolia* (Reich.). 89. Near Ardblair Loch.—*R. palustris* Moench. 89. A form with remarkably cut leaves, growing by Stormont Loch, may be var. *pinnatifida* Tausch; but we have seen no description.

**Barbarea intermedia* Boreau. 89. In fair quantity and fruiting well by the Shee Water, below the Spittal, so that it bids fair to become established; we do not know of any previous occurrence in Scotland.

Geranium sylvaticum L. 89. Near the Spittal we found growing with the type a few specimens which appear to agree with var. *Wanneri* Briquet, a new variety for Britain, excepting the foliage. In Rouy's *Flore de France*, iv. 81, it is thus described: "Feuilles

de la var. γ [*angustisectum* Beck], ou même plus étroites, presque semblables à celles du *G. rivulare*; fleurs médiocres, a pétales d'un rose pâle veinés de rose foncé; pédoncules glanduleux." The flowers are much like those of *G. versicolor* L.

Rosa mollis × *spinosissima*. 92. Left bank of the Clunie, near its junction with the Dee; flowers white, sparingly produced.

Pyrus Aria Ehrh. 92. An old tree, growing out of the rocky bank of the stream below the Linn of Quoich, looks truly native.

Galium erectum Huds. 89. Native in a pasture near the Lornty Burn, about three miles from Blairgowrie. — *G. sylvestre* Poll. 92. On the old coach road, near the top of the Cairnwell Pass, growing on limestone at 2000 ft.

Hieracium Pilosella* L. var. *nigrescens* Fr. 89. Glen Shee.—*H. gracilentum* Backh. 92. High rocks in Corrie Kander, Glen Callater; a form with pure yellow styles.—*H. chrysanthum* Backh. var. *microcephalum* Backh. 92. Scattered among the heather, descending from Lochnagar to the Dhu Loch, at 2600 to 2800 ft.; usually small and one-headed in this station.—H. nigrescens* Willd. var. *commutatum* Lindeb. 89. Lochy Burn, Glen Shee. 92. Glen Callater. Very scarce in both places. — **H. submurorum* Lindeb. 92. Stream-side (1800 ft.) in Glen Callater; leaves not quite typical. — *H. lasiophyllum* Koch. 92. Fine and plentiful on slate rocks near the shooting-lodge, Glen Slugain.—Var. *euryodon* F. J. Hanb. 89. Sandstone rocks by the Ericht at Craighall, Blairgowrie. —**H. caledonicum* F. J. Hanb. 89. Shee Water.—*H. Sommerfeltii* Lindeb. 92. Abundant and well distributed in the neighbourhood of Braemar. — **H. sylvaticum* Gouan var. *micracladium* Dahlst. 89. By the Ericht, near Craighall; near Spittal of Glen Shee.—*H. aggregatum* Backh. 92. Stream-side (1800 ft.) in Glen Callater; scarce. — *H. variicolor* Dahlst. 92. Glen Ey; also *H. Pictorum* Linton, and a form of **H. subulatidens* Dahlst.—*H. crebidens* Dahlst. 92. Glen Clunie, a mile or two above Braemar.—**H. rivale* F. J. Hanb. 89. By the Ericht, near Craighall; a peculiar form, tending towards *H. Pictorum* in some respects. — **H. petrocharis* Linton. 89. Lochy Burn, Glen Shee. *92. Glen Ey.—*H. sagittatum* Lindeb. var. *subhirtum* F. J. Hanb. 92. Glen Clunie.—*Var. *philanthrax* Dahlst. 89. Coolah Burn, Glen Beg, and streamlets in Glen Shee (1200 to 1500 ft.).—**H. sarcophyllum* Stenstr. 89. Coolah Burn; the form near *expallidiforme* and *acrogymnon*, mentioned in W. R. Linton's *British Hieracia*, p. 55.—**H. dissimile* Lindeb. 89. Rather frequent in Glen Shee and Glen Beg; not quite typical, but like the form of the Killin district. — **H. porrigens* Almq. 89. Glen Shee; named by W. R. Linton with some little doubt, as being perhaps too near another plant, which is certainly *H. diaphanum* Fr.—**H. vulgatum* Fr. var. *sejunctum* W. R. Linton. 92. Near the Linn of Corriemulzie.—**H. pinnatifidum* Lönnr. 89. Shee Water; very scarce. — **H. acroleucum* Stenstr. var. *dædalolepium* Dahlst. 89. Abundant on shingle by the Shee Water, a mile and a half below the Spittal; not previously recorded from Scotland. A striking plant; the coriaceous leaves being beautifully tinged with violet-purple, especially beneath. Flowers deep golden-yellow;

ligule-tips glabrous.—*_H. diaphanoides_ Lindeb. 89. Shee Water and Lochy Burn (the type is new for Scotland).—*Var. _apiculatum_ Linton. 89. Lochy Burn; very rare.—*_H. barbareæfolium_ Lönnr.? 92. By the Clunie, just below Bræmar. W. R. Linton writes that this is characterized by narrow, deeply-cut stem-leaves; heads like _H. sciaphilum_, but with glabrous ligules. Our plant usually has petioled, very truncate-based stem-leaves, strongly and deeply dentate below with about three pairs of teeth, and triangular-oblong in outline. Styles greenish livid.—*_H. sparsifolium_ Lindeb. var. _placerophyllum_ Dahlst. 89. Rocks by the Ericht, near Craighall; this variety was not known before from Scotland.—Var. _longiciliatum_ F. J. Hanb. In two Glen Dee localities, as well as a new one in Glen Clunie; it clearly belongs to _H. sparsifolium_ rather than _H. rigidum_. Styles yellow or greenish yellow.

Rhinanthus monticola Druce. 92. Plentiful in dry, grassy ground, Glen Dee, near Allan-a-Quoich.—_R. borealis_ Druce. 92. Rocks in Glen Callater, at 2500 ft.

Melampyrum pratense L. var. _hians_ Druce. 92. Frequent near Braemar.

Mentha aquatica L., var. 92. A mint found growing on the stony bed of a backwater of the Clunie, a little above Braemar, has the very sweet scent of _M. citrata_ Ehrh., but lacks its numerous glands; the calyces are also pubescent, and the leaves have scattered hairs on the upper surface. Mr. C. E. Salmon refers it to var. _subglabra_ (Baker). It is near a cottage, and may have escaped from cultivation.

Betula intermedia Thomas (_B. nana_, male, × _pubescens_, female). 92. One fine tree, by the Callater Burn, at 1700 ft., comes very near the form originally found in the same glen (1886), which grew higher up. Two smaller trees in Glen Slugain are probably the same combination, but decidedly approach _B. pubescens_. A very curious little shrub occurs at about 2800 ft. in wet, peaty ground on the descent from Lochnagar to the Dhu Loch. Habit creeping-rooting; hardly 6 in. high; leaves small, nearer to _B. nana_ (which is, no doubt, the female parent), varying in shape from broader than long or suborbicular to ovate, bluntly toothed, more or less hairy; without inflorescence. It differs greatly from _B. alpestris_ Fr., and may be an undescribed form of the hybrid.

Salix cinerea L. 89. Ascends to 1700 ft. by the Lochy Burn. Unlike _S. aurita_ and _S. caprea_, this is usually quite a lowland species.—_S. lapponum_ L. 92. A large bush, about 10 ft. by 8 ft. across, and with very white foliage, grows at 2400 ft. by the Allt-Lochan-nan-Eoin, Ballochbuie Forest; it is probably the form which Smith called _S. Stuartiana_.—*_S. aurita_ × _nigricans_. 89. Near Spittal of Glen Shee.—_S. aurita_ × _phylicifolia_. 89. Two female bushes by the Lochy Burn, at 1200 or 1300 ft.—*_S. caprea_ × _repens_. 89. By a streamlet in Glen Shee, at 1250 ft. An erect bush, about 4 ft. high, much nearer to _S. caprea_; but the silky pubescent foliage is smaller, and has _repens_-like serration. *92. By the Callater Burn, at about 1750 ft. A procumbent plant, approaching _S. repens_, which was probably the female parent. The

Armadale (W. Sutherland) willow, so named by Dr. Buchanan White, is certainly *S. cinerea* × *repens*, as Messrs. Linton have stated.—*S. herbacea* × *lapponum*. 89. Lochy Burn, at 1400 ft.—**S. herbacea* × *nigricans*. 89. Rocky bank of a streamlet in Glen Shee, at 1500 ft.; a trailing bush in fine fruit. The foliage blackened much in drying. — **S. herbacea* × *repens*. 89. Not uncommon in Glen Shee, between 1200 and 1500 ft., with the parents; more or less intermediate, but varying a good deal in foliage. It might easily be passed by as a *Vaccinium*. 92. Between Loch Callater and Lochnagar, at 2500 ft. We also gathered Mr. Linton's original *S. cernua* on the Little Craigindal.—*S. lapponum* × *repens*. 89. The plant published under this name in 1893 was cultivated, and proved to be only *S. lapponum*; but we found two specimens of the hybrid by the Lochy Burn, so the record can stand.

Juniperus communis L. 92. A procumbent bush on the rocks of Little Craigindal has the foliage of this, but fruit more like *J. nana* Willd., and is probably var. *intermedia* Nyman.

**Orchis latifolia* × *maculata*. 89. One specimen occurred with the parents in Glen Shee.

[*Allium Schœnoprasum* L. 92. By the Clunie at Braemar; certainly an outcast or garden escape.]

Juncus castaneus Sm. 92. One fine plant, high up in Corrie Kander.

Scirpus Tabernæmontani Gmel. 89. Locally plentiful on the north-west side of Fingask Loch; a rare species inland.—*S. fluitans* L. 89. In the Lunan Burn, near Marlee Loch.

Carex remota L. 89. Marlee. — *C. helvola* Blytt. 92. The locality for this on Lochnagar, at 3500 ft., agrees very closely with Balfour's original one for *C. Lachenalii* Schkuhr (*lagopina*), as described by Syme; but we failed to find the latter after a careful search. However, we were fortunate enough to detect *C. helvola* at 3300 ft. in the northern corrie, close by a fine patch of *C. Lachenalii*, and associated with *C. curta*. We have no doubt that it is *C. curta* × *Lachenalii*; and Herr Kükenthal names good specimens from both stations "*C. canescens* × *lagopina*; very characteristic." Rev. E. F. Linton has cultivated roots received from Mr. F. C. Crawford, which remained sterile. The pale yellow colour of the spikes is well-marked, especially in dried specimens.—*C. curta* Good. var. *fallax* F. Kurtz (under *C. canescens* L.). 92. By Lochan-nan-Eoin (2500 ft.), Lochnagar. "Differs from var. *robusta* Blytt (= *dubia* Bailey) by its slender habit and small spikelets" Kükenthal *in litt.* (Fries gives Blytt's variety as *robustior*). Herr Kükenthal also places here a sedge sent by Mr. C. P. Hurst, gathered on Ben Lawers, at 2900 ft., which matches specimens distributed by Mr. Druce as *C. helvola*, var. — *C. aquatilis* Wahl. 89. Near Spittal of Glen Shee; a form intermediate between type and var. *virescens* And. 92. Corrie Kander, on wet slopes at about 2800 ft.; a small state, which is named forma *angustifolia* Kükenth. *ined.* — **C. aquatilis* × *Goodenowii*. 89. Near Spittal of Glen Shee, with the parents.—*C. Goodenowii* J. Gay. 92. A strict,

slender, narrow-leaved plant, growing in a pool near Lochan-nan-Eoin, is called by Herr Kükenthal var. *recta* (Fleischer), which appears to be the same as var. *recta* Aschers. & Graebn.; but we cannot see how it differs from var. *juncella*. He names a black-spiked plant from the banks of the Clunie, Braemar, "forma *fuliginosa* R. Br. = *C. melæna* Wimm."—**C. Goodenowii* × *rigida*. 92. Lochnagar, in two places, with *C. helvola*; also with *C. rariflora* Sm. (remarkably fine) in a swamp, at 2800 ft., descending to the Dhu Loch. Determined by Herr Kükenthal, who writes that Dreyer's *C. infuscata* is merely a narrow-leaved, dark-spiked form of *C. rigida*.

Avena pratensis L. var. *longifolia* (Parn.). 92. Glen Ey.

Poa Balfouri Parn. 92. On exposed rocks by the Clunie, Braemar, at about 1100 ft.

Glyceria fluitans* R. Br. var. *triticea* Fr. 89. Ardblair Loch; Stormont Loch. *92. Marshes in Glen Dee, near Allan-a-Quoich.—G. declinata* Bréb. 89. Muddy ground near Fingask Loch.

Lycopodium alpinum L. var. *decipiens* Syme. 92. Lochnagar; Little Craigindal.

Chara aspera Willd. 89. Black Loch, near Blairgowrie.

Nitella opaca Agardh. 89. Abundant in a mill-lead between White Loch and Fingask Loch.

HYBRIDS AMONG BRITISH PHANEROGAMS.

By the Rev. E. F. Linton, M.A.

(Concluded from p. 276.)

Polygonaceæ. — *Polygonum*. Mr. Marshall reminds me of *P. minus* × *Persicaria* and *P. mite* × *Persicaria* (*B. E. C. Rpt.* 1892, p. 384), the latter "*teste* Lange," and probably the former also, collected by Mr. Druce from Abingdon, Berks, September, 1892. I have many specimens of hybrids from Germany, &c., but have not detected any in Britain. The *P. minus* × *Persicaria* which I issued from a gathering at Wareham, September, 1891 (*B. E. C. Rpt.* 1891, 343), I proved to be *P. minus*; so elongate in the wild state that Mr. Ar. Bennett thought it a variety. My specimens of Continental hybrids show great sterility. Dr. Focke says on *P. minus* × *Persicaria*, "very floriferous, but sterile or very slightly fertile."

Rumex conglomeratus × *maritimus*, Worthing, Sussex; "seems to be fairly fertile," *Dr. Focke*. Rev. A. Ley's Hoarwithy plant is, I think, rightly named *R. conglomeratus* × *sanguineus* (*R. Ruhmeri* Haussknecht). *R. conglomeratus* × *obtusifolius* I gathered at Witley many years ago, and think that the *R. sylvestris* Wallr. from Kew riverside, though I have only a poor specimen, is this same hybrid; my specimens from Witley were rather sterile. *R. conglomeratus* × *pulcher* (*B. E. C. Rept.* 1872–74, p. 34). *R. conglomeratus* × *crispus*,

gathered at Witley in company with Mr. Marshall.—*R. pulcher* × *rupestris* (*B. E. C. Rpt.* 1876, p. 31).—*R. obtusifolius* × *pulcher*, West Head, E. Cornwall (*B.E.C. Rpt.* 1877–78, 18.).—*R. crispus* × *domesticus*.—*R. crispus* × *pulcher*.—*R. crispus* × *sanguineus* I have not seen, but I have sheets of *R. crispus* × *viridis* from Malvern, Worcestershire, and Radnor. *R. crispus* × *obtusifolius* (*R. acutus* L. *R. pratensis* M. & K.) is the most widely spread of our Dock hybrids, and is said by Mr. J. W. White, in the *Flora of Somerset*, to fruit freely in that county; the Rev. R. P. Murray, however, thinks it fruits only sparingly, and Dr. Focke says, "fruits mostly imperfect." *R. domesticus* × *obtusifolius* (*R. conspersus* Hartm.) is also said to be fertile like *R. pratensis* in the *B. E. C. Rpt.* 1872–74, p. 36, where some good notes on *Rumex* by J. Boswell Syme occur.

THYMELÆACEÆ.—*Daphne Laureola* × *Mezereum* was recorded by Mr. Marshall from Sussex in 1903 (*Journ. Bot.* 1903, 230), and he has happily been able to confirm the record of the hybrid by discovering a better intermediate, near Somerton, in which the leaves are more or less evergreen, though like *D. Mezereum* in shape and veining.

AMENTACEÆ.—*Betula pubescens* × *verrucosa* (*B. odorata* Bechst.?). To this hybrid Mr. Marshall refers specimens of his own gathering from Lawers, Mid-Perth, and Blair Athol, Perthshire, and of my gathering from Breamore, S. Hants. He also informs me that we have three hybrids of *B. nana* × *pubescens*:—1. *B. intermedia* Thomas (*nana*, male × *pubescens*, female); 2. *B. alpestris* Fries (*nana*, female × *pubescens*, male); and 3, a dwarf plant which appears to him a new form. Mr. Marshall tells me that the late Prof. Babington wrote to him about 1889 that *B. intermedia* formed quite woods in Iceland; so he infers it is probably fertile [see p. 294].

Salix. In *Journ. Bot.* 1902, p. 330, the following sentence occurs: "Now, according to Wichura, the hybrids of *Salix* reproduce themselves like pure species"; and the inference is drawn that *Hieracium* species have become multiplied and established in the same way. I have already shown how unsafe it is to apply the rule of one genus to another in respect to the characters of hybrids. But the above dictum, attributed to Wichura, is far too general a statement, and can easily be rebutted. Not to rely too much on the well-known variability of some willow hybrids, such as *S. viridis* Fr. or *S. lutescens* Kerner, I have myself crossed the two sexes of *S. aurita* × *Lapponum*, and reared the offspring, only to find the greatest variability in the results of one sowing. The hybrids which occur spontaneously in Britain may be shown most clearly by enumerating the unions which each species has been known to make:—

S. pentandra hybridizes with *fragilis* and *alba* (?).

S. triandra with *fragilis*, *alba*, and *viminalis*.

S. fragilis with *pentandra*, *triandra*, and *alba*.

S. alba with *pentandra*? and *triandra* and *fragilis*.

S. purpurea with *viminalis*, *aurita*, *cinerea*, *phylicifolia* and *repens*.

S. viminalis with *triandra*, *purpurea*, *Caprea*, *aurita*, *cinerea*, and *repens*.

S. Lapponum with *Caprea*, *aurita*, *cinerea*, *phylicifolia*, *Arbuscula*, *repens*, *lanata*, *Myrsinites*, and *herbacea*.

S. Caprea with *viminalis*, *Lapponum*, *aurita*, *cinerea*, *phylicifolia*, *nigricans*, *repens*, and *Myrsinites*.

S. aurita with *purpurea*, *viminalis*, *Lapponum*, *Caprea*, *cinerea*, *nigricans*, *phylicifolia*, *repens*, *Myrsinites*, and *herbacea*.

S. cinerea with *purpurea*, *viminalis*, *Lapponum*, *Caprea*, *aurita*, *nigricans*, *phylicifolia*, and *repens*.

S. nigricans with *Caprea*, *aurita*, *cinerea*, *phylicifolia*, *Arbuscula*, *Myrsinites*, and *herbacea*.

S. phylicifolia with *purpurea*, *Lapponum*, *Caprea*, *aurita*, *cinerea*, *repens*, *Arbuscula*, *Myrsinites*, and *herbacea*.

S. Arbuscula with *Lapponum*, *nigricans*, *phylicifolia*, and *herbacea*.

S. repens with *purpurea*, *viminalis*, *Lapponum*, *Caprea*, *aurita*, *cinerea*, *phylicifolia*, and *herbacea*.

S. lanata with *Lapponum*, *herbacea*, and *reticulata*.

S. Myrsinites with *Lapponum*, *Caprea*, *aurita*, *nigricans*, *phylicifolia*, and *herbacea*.

S. herbacea with *Lapponum*, *aurita*, *nigricans* (?), *phylicifolia*, *Arbuscula*, *repens*, *lanata*, *Myrsinites*, and *reticulata*.

S. reticulata with *lanata* and *herbacea*.

Besides, a few triple hybrids have been noticed, such as *S. purpurea* × *aurita* × *phylicifolia* (*S. sesquitertia* B. White), *S. lutescens* × *nigricans*, and *S. aurita* × *cinerea* × *repens*, which Mr. Marshall has recently reported to me. The hybrids in this genus are fertile, and have been crossed with one another for the sake of experiment. In this way Max Wichura blended six strains of willow in one.

Populus canescens Sm. has been reckoned a hybrid, and is given in De Candolle's *Prodromus* as very probably produced by *P. alba* × *P. tremula*.

Orchidaceæ appear to resemble Salices in their great freedom of intercrossing, and in the fertility of the hybrids. Mr. F. J. Hanbury tells me that in the cultivated species many of the hybrids are just as fertile as the original species. All do not equally well produce good pollen-masses, but many hybrids will cross with other hybrids, so that you may have four or more species blended in one. I have no evidence to show that British hybrids are fertile; as a rule they have only been found very sparsely, and the natural inference would be that they do not reproduce themselves. — *Epipactis atrorubens* × *latifolia*, one plant on limestone near Tongue, W. Sutherland, 1900, with the parents, *E. S. Marshall*; not rare, according to Focke, in Europe, where the parents grow together (Germany, Russia). — *Orchis incarnata* × *latifolia*, Mr. Marshall believes, is recorded from Sussex; and it occurs in the Avon Valley near Christchurch, where both species are rather abundant, and some plants intermediate.—*O. latifolia* × *maculata* occurs. I have gathered it near Odiham and near Milford in Hants. — *O. latifolia* × *ericetorum* grows in a wet meadow in Edmondsham, Dorset.—

O. maculata × *Habenaria conopsea* was observed near Sevenoaks by Mr. Henry Peirson in 1898, and described in an interesting note in this Journal (1898, 360).—*O. ericetorum* × *H. conopsea* has been gathered by Mr. Marshall in W. Sutherland, 1900, and at Clova, Forfar, 1904; also in Berwickshire by Mr. G. C. Druce (*Ann. Scott. Nat. Hist.* 1907, 100). Another *Habenaria* hybrid is *H. albida* × *conopsea*, first published for Britain in this Journal (1898, 352), and previously recorded from the Austrian Alps. Specimens from Arisaig, W. Inverness, were submitted to Mr. Rolfe and myself by Major A. H. Wolley-Dod, and we both arrived at the same conclusion independently. I grew my root and flowered it for three years, and noted that it matured no capsule; from which sterility might be inferred, or the absence of the right moth. Since that date this hybrid has been gathered by Mr. Marshall at Tongue, and at Scullomie, W. Inverness.—*Ophrys apifera* × *Arachnites*, *O. apifera* × *aranifera*, and *O. Arachnites* × *aranifera* are recorded in the *Flora of Kent* (1899), with full particulars and comments. In 1905 a presumed natural hybrid between *O. aranifera* and *O. muscifera* was found on Wye Downs, Kent, and described and figured in the *Orchid Review* (1905, 233) and in this Journal (1906, 347). Found long ago in Germany, and figured by Reichenbach.

Juncaceæ.—*Juncus effusus* × *glaucus* (*J. diffusus* Hoppe) has long been known, and is recorded from thirty-six vice-counties. I have always found it sterile. — *J. conglomeratus* × *glaucus* was found by Rev. W. R. Linton and myself twenty years ago in two parishes in E. Norfolk; this, too, was sterile. The Rev. E. S. Marshall once gathered in Kent what he believed to be this hybrid, as both supposed parents were present, and *J. effusus* was absent. The inflorescence in the Norfolk specimens was almost as much condensed as in *J. conglomeratus*.—*J. acutiflorus* × *lamprocarpus* is on record, by Mr. W. H. Beeby; my Norfolk specimens seemed quite sterile. — *Luzula Forsteri* × *vernalis* (*L. Borreri* Bromf.), which forms large tufts at Symond's Yat, and is more conspicuous than either parent there, and has a fairly wide distribution, is completely sterile.

Typha latifolia L. var. *media* Syme may be a hybrid between our two species. At any rate, I have long believed specimens I gathered in the railway pool near Bletchley Station and called *media* to be the hybrid.

Naiadaceæ.—*Potamogeton.* In this puzzling genus hybridity is believed by our best judges to have played an important part in producing what are now well-established forms or "species." The hybrids are usually sterile, setting it may be an occasional fruit (I found only two in a large number of specimens of *P. salicifolius* the Rev. A. Ley and I gathered in the Wye); and Mr. A. Bennett tells me of a fruiting *P. decipiens* Nolte from near Burwell, Cambs, as a very exceptional case. The following notes on this genus are from what Mr. Bennett has furnished me with, unless Mr. A. Fryer, who has also contributed several valuable notes, is quoted by name.—*P. natans* × *lucens* (*P. fluitans* Roth).—*P. natans* × *Zizii* (*P. crassi-*

folius Fryer).—*P. sparganiifolius* Bab. non Laestad. (*P. Kirkii* Syme) is believed by Fryer to be probably *P. natans* × *polygonifolius*.—*P. Griffithii* Bennett is certainly a hybrid, *fide* Fryer (*P. polygonifolius* × ?); it is *P. alpinus* × *prælongus* according to Ascherson & Graebner (*Syn. Fl. Mitteleurop.* i. 1897, p. 317), but Mr. Bennett still holds it to be a species, remarking that *P. prælongus* is not known for Carnarvon, and has only one station in Anglesea.—*P. Drucei* Fryer (*P. natans* × *alpinus* ?). — *P. heterophyllus* × *P. coloratus* (*P. gracilis* Wolfgang).—*P. lanceolatus* Sm. On this Mr. Fryer writes to me: "Certainly a hybrid. No two forms of this from different localities are alike. Our Cambridgeshire form is *P. heterophyllus* × *Friesii*, and deserves a segregate name. Smith's plant (*i.e.* the Anglesea plant) is evidently *P. heterophyllus* × *pusillus*. I am inclined to assign the same origin to the Irish form. And he adds that he is strongly inclined to think that local peculiarities in a parent plant are imposed on its hybrid offspring. —*P. rivularis* Gillot (*P. heterophyllus* × *pusillus* ?), *fide* A. Bennett, who gives me *P. lanceolatus* Sm. as = *P. heterophyllus* × *Friesii* ?—*P. heterophyllus* × *natans* (*P. Tiselii* Richter). — *P. falcatus* is put to *P. heterophyllus* (*subgramineus*) × *nitens* β *falcatus* by Asch. & Graebner (*l. c.* p. 328). Mr. Fryer, who does not offer this or any other solution, remarks, *in litt.*, "It has kept its characters for many years in the original locality, and also under cultivation until it fruited."—*P. nitens* Web. Mr. Fryer considers to be always a hybrid of varied parentage, and questions whether it ever bears more than an occasional perfect fruit, never a fruiting-spike. Mr. Bennett ascribes it to *P. heterophyllus* × *perfoliatus*.—*P. lucens* × *prælongus* (*P. Babingtonii* Ar. Benn., *P. longifolius* Bab. non Gay). —*P. lucens* × *perfoliatus* (*P. decipiens* Nolte). — *P. decipiens* Nolte var. *affinis* Ar. Benn., Mr. Bennett now thinks is probably *P. decipiens* × *nitens* = *P. Brotherstonii* Ar. Benn. MS., but (he adds) Asch. & Graebner (p. 330) place it under *P. perfoliatus* × *lucens* (*P. decipiens* p. pte.).—*P. salicifolius* Wolfgang (the Herefordshire form) is thought by Mr. Fryer to be a hybrid of unknown origin. Mr. Bennett believes Wolfgang's plant to be *P. alpinus* × *lucens*.—*P. angustifolius* × *heterophyllus* (*P. varians* Morong ex Fryer).—*P. angustifolius* × *coloratus* (*P. Billupsii* Fryer).—*P. prælongus* × *polygonifolius* (*P. Macvicarii* Ar. Benn. *Ann. Scott. Nat. Hist.* 1907, 106).—*P. crispus* × *perfoliatus* (*P. Cooperi* Fryer and var. *Jacksoni* Fryer).—*P. crispus* × *prælongus* (*P. undulatus* Wolfgang), see paper by Ar. Bennett (*Ann. Scott. Nat. Hist.* 1907, 104).—*P. crispus* × *obtusifolius* (*P. Bennettii* Fryer).—*P. crispus* × *Friesii* (*P. Lintoni* Fryer). I have remarked above on the general sterility of the hybrids of this genus. It is not impossible that sterility is the universal rule here, and that the exceptions are due to fertilization by the pollen of one of the parent plants. For Mr. Bennett on this point observes that "in many (hybrids) the flowers do not open, and in others, when they do, the pollen is bad." If this is always the case, we cannot attribute fertilization to the hybrid, and can hardly do otherwise than fall back on a parent plant for the male element.

CYPERACEÆ. — *Scirpus carinatus* Smith is reputed a hybrid between *S. triqueter* L. and *S. lacustris* L., being found in tidal estuaries where these two both occur. The absence of any modern description of the nut (see *Bab. Man.* ed. ix.) points to its probable sterility.

Carex paniculata × *remota* (*C. Boenninghauseniana* Weihe).—*C. paniculata* × *vulpina*, discovered by Rev. E. S. Marshall in Surrey, and determined by Pfarrer Kükenthal, with whose naming I agree. —*C. muricata* × *remota* is said by Mr. Marshall to have been collected by Mr. Druce, and he tells me that Focke calls it "perhaps the commonest *Carex*-hybrid," which of course is not the case with us. Possibly Focke follows Nyman in identifying this hybrid with *C. axillaris* Good. (as also Hooker, *Stud. Flora*). But this hybrid is so scarce, almost unknown, in fact, in Britain, that it is more probable those of us are right who identify *C. axillaris* Good. with *C. remota* × *vulpina*, which is perhaps the commonest sedge-hybrid with us. — *Carex muricata* × *vulpina* is my solution of a sedge gathered by Mr. Marshall in 1892 at Clymping, W. Sussex, and issued by him as *C. muricata* L. I suggested *C. axillaris*, which Mr. Marshall was inclined to accept, till under cultivation it produced a shorter spike, more like a vigorous *C. muricata*. Pfarrer Kükenthal named it later *C. vulpina* L. var. *nemorosa* Rebent., calling it a shade form. The plant is, however, wanting in some of the chief characters of *C. vulpina*, and in these respects it approaches *C. muricata*, which parent it most resembles of the two. —*C. remota* × *vulpina* is what I regard as *C. axillaris* Good.; in this Mr. Marshall concurs. — *C. divulsa* × *vulpina* was originally found by Mr. R. F. Towndrow at Newland, Malvern, Worcestershire, in 1889; one plant only, which died out. It did not attract much attention, perhaps through Babington referring it (*Wats. B. E. C. Report*) to *C. divulsa*, of which he said it had the nut. (With one of my specimens a piece of *C. divulsa* was attached, and this may have happened with the sheet submitted to the Professor.) I have many specimens of this gathering, and fertile *nuts* are by no means easy to find. But there is very clear evidence of *C. vulpina* in the fruit. This hybrid was gathered later, in July, 1902, Portskewett, Monmouth, by Messrs. Marshall and Shoolbred; and the specimens, though rather immature, are borne out by Mr. Towndrow's gathering.—*C. helvola* Blytt is in the *London Catalogue* list as a species; was thought by some to be *C. curta* × *echinata*, but is now more usually regarded as *C. approximata* × *curta*. The evidence is very strong in favour of the Lochnagar plant being *C. helvola* Blytt in the latter sense. I have vigorous plants of it in cultivation, whose compact spikes, now flowering (early May), recall *C. approximata*, which was present in the original station. The hybrid proved sterile last year.—*C. curta* × *echinata*, as represented by Mr. Druce's gathering of August, 1897, from Ben Lawers, differs from the last, though equally sterile. The nut is sufficiently formed to show an ovate acuminate shape, such as might be expected to result from *C. echinata* and *C. curta*, but would be a very surprising result from *C. approximata* and *C. curta*, both of which

at the same stage have narrow oval or elliptic nuts with no acuminate beak. The spikes are lax, with the lower spikelets remote, differing obviously from the Lochnagar plant in this; and as yet I believe *C. approximata* has not been found on the Breadalbanes.—*C. acuta* × *Hudsonii*? Specimens sent me by the Rev. H. J. Riddelsdell from Crymlyn Bog, near Swansea, may be this, unless it is merely *C. Hudsonii* Ar. Benn. starved into sterility by the poisonous fumes of chemical works. I also am inclined to believe that a plant from which Mr. R. A. Phillips sent me specimens labelled *C. stricta* from Castle Connell, Co. Limerick, is *C. acuta* × *Hudsonii*. — *C. acuta* × *Goodenowii* occurs just north of the railway, Christchurch, S. Hants, and at Wareham, Dorset, and I have seen specimens from other localities; Mr. R. A. Phillips sent it me lately from Banagher, King's County.—*C. trinervis*, from Ormesby Common, Norfolk, E., was sterile in its native locality and affected with *Puccinia*, and continued so in my garden. I have long entertained the suspicion that this plant is not *C. trinervis* Degland, but *C. Goodenowii* × *flacca*.—*C. aquatilis* × *Hudsonii* (*C. hibernica* Ar. Benn.). See *Journ. Bot.* 1897, p. 250. —*C. aquatilis* × *rigida*, moorland near Clova, Forfar.—*C. aquatilis* × *Kattegatensis* var. *salina* (*C. Grantii* Ar. Benn., *l. c.* p. 250).—*C. aquatilis* × *Goodenowii*, known from Clova, Forfar, Caithness, and Spittal of Glen Shee, E. Perth (*B. E. C. Rpt.* 1906, 246).—*C. Goodenowii* × *rigida* has been gathered by Mr. Marshall from the White Water, Forfar, 1904, and so named by Pfarrer Kükenthal "in spite of its apparent fertility," and also on Lochnagar, 1906; and by myself and the Rev. W. R. Linton in Glen Doll, Forfar, 1890, near the Dhu Loch, S. Aberdeen, 1889, and on Meall nan Tarmachan, Mid-Perth, 1891. I agree with the naming of the first-named gathering, but demur to the supposed fertility; my specimens show flat unfertilized nuts.—*C. fulva* Good. is stated to be a hybrid of *C. flava* and *C. Hornschuchiana*. Mr. Marshall reports three hybrids of this group: *C. lepidocarpa* Tausch., *C. Œderi* Retz. and its var. *œdocarpa*, each crossing with *C. Hornschuchiana*, and he considers the last to be the most frequent. — *C. acutiformis* × *riparia* ought to occur frequently, if proximity of the parents favoured union. But I have not seen or heard of it till the Rev. H. J. Riddelsdell sent me specimens from Peterston, Glamorgan, labelled *C. riparia* L., which I have no doubt are this hybrid. This led me to recognize the same hybrid with much probability in specimens I had laid in from Brandon, Norfolk, as *C. acutiformis* Ehrh. var.—*C. acutiformis* × *rostrata*—so I interpret a puzzling plant gathered by Mr. C. Waterfall near Tewkesbury, Glos., in 1902, and labelled *C. acuta* L., which it somewhat resembled.—*C. rostrata* × *vesicaria* is believed by Mr. Marshall to be the solution of *C. involuta* Bab.; and Messrs. Groves (*Bab. Man.* ed. ix.) allow it as possibly correct. The form of the hybrid I have gathered at Wareham, Dorset, is not identical, and seemed to me peculiar in having its stigmas included; it was, of course, sterile. Specimens have been sent me as crosses between *C. flava* aggreg. and

C. pulla Good., but so near one parent or the other that I have not been fully satisfied.

GRAMINACEÆ. —*Alopecurus geniculatus* × *pratensis* (*A. hybridus* Wimmer) from near Kenilworth, Warwickshire, named by Hackel, to whom Mr. A. B. Jackson sent it, and from Armitage, Staffs. (*Journ. Bot.* 1901, 234; *B. E. C. Rpt.* 1900, 650).—*Polypogon littoralis* Sm. is, I think, undoubtedly *Agrostis palustris* Huds. × *Polpogon monspeliensis* Desf. I have seen it with these supposed parents at Porchester, S. Hants, and also at Littlesea, Dorset. From the latter locality I grew a root for three years in the garden, and as no seedling occurred, I assume it is sterile.—*Ammophila baltica* R. & S., Norfolk and Northumberland, has long been regarded by German botanists as *Ammophila arundinacea* Host × *Calamagrostis epigeios* Roth. Focke (*l. c.* pp. 408–9) writes: "*Calamagrostis arenaria* Roth × *epigeios* Roth occurs sporadically on the coasts of the North Sea and the Baltic, everywhere sparingly. Habit of *C. arenaria*, but recalling strong *epigeios* by the loose, brownish inflorescence. Occurs by the North Sea on islands from which *C. epigeios* is now absent, but probably grew formerly. Is totally sterile. *C. arenaria* = *Psamma arenaria* R. et Sch., *Ammophila arenaria* Link, &c." The seeds of seaside grasses can be carried about in so many ways, by gales, tides, and wading birds' muddy feet, that the hybrid's occurrence, where one of the parents is absent, is easily accounted for.—*Poa.* Mr. Marshall writes to me that Mr. H. Fisher determined some years ago two grasses which he collected in Corrie Ardran, Mid-Perth, as *P. annua* × *pratensis*, n. hybr. and *P. annua* × *glauca*, n. hybr.; and a third, from Ben Creachan, Argyle, as probably *P. nemoralis* × *pratensis.* He believes that these solutions, or, at any rate, the first two, are correct. —*Glyceria fluitans* × *plicata* (*G. pedicellata* Townsend) is perfectly sterile, *fide* Rev. W. R. Linton. Mr. Marshall tells me that Mr. Townsend from the first suspected hybridity, and latterly was convinced of it.—*Festuca loliacea* Huds. stands in the *London Catalogue* as *F. elatior* × *Lolium perenne.* I think the hybrid, as I have found it, has usually been *F. pratensis* × *L. perenne.*—*Triticum acutum* DC. (*Agropyron acutum* R. & S.) is given by Messrs. Groves in *Bab. Man.* without note of hybridity, but we have for some years been tending to the view that most of our plant, so-called, is *T. junceum* × *repens.* "It has received many names by botanical writers, and is the *T. acutum* for the greater part of our British lists," writes Mr. Druce, who, however, thinks it needs one more, and denominates it "*A. Hackelii* mihi, *A. repens* × *junceum* forma *cristata* Hack. *in litt.*" (*B. E. C. Rpt.* 1906, 252).

To this paper on Hybrids among Phanerogams, I add such few notes as have reached me on Hybrids among the Cryptogams at the end of the *London Catalogue.*

POLYPODIACEÆ.—*Asplenium Trichomanes* × *Ruta-muraria* (*A. Clermontæ* Syme).—*A. germanicum* Weiss has been thought to be *A. Ruta-muraria* × *septentrionale*, a view held strongly by the Rev. R. P. Murray. "A. Kerner has suggested that it may be a hybrid which has become fixed" (Focke). — *Lastrea remota* Moore has been

suspected of being *L. Filix-mas* × *spinulosa*. "Occurs sporadically and sparingly in various districts" (Focke). Syme (*Eng. Bot.* ed. 3, vol. 12, p. 82, 1886) has a remark to the effect that he suspected *L. glandulosa* to be a hybrid = *L. spinulosa* × *dilatata*; *L. uliginosa* to be *L. cristata* × *spinulosa*; and *L. remota* to connect *L. spinulosa* (more probably *L. dilatata*) with *L. Filix-mas*. The Rev. A. Ley wrote on *L. glandulosa*: "It does not seem reasonable to attribute it to *L. spinulosa* × *dilatata*, although I have never seen it growing except where both these species are present within a short distance" (*B. E. C. Rpt.* 1899, p. 616). I have not had much opportunity of studying these supposed *Lastrea* hybrids.—*Polypodium vulgare* var. *serratum* Willd. is, according to Timbal-Lagrave, *P. vulgare* × *Aspidium aculeatum*; and *P. cambricum* L. was considered by him to be *P. vulgare* × *Pteris aquilina* (Focke); and Mr. Marshall, who gives me this information, thinks the latter at least not very unlikely, as it seems always to be without fructification. I do not feel inclined at present to express an opinion.

Equisetaceæ.—*Equisetum arvense* × *limosum* "is a very widely spread and rather frequent hybrid, occurring in different forms . . . . . *E. littorale* Kuel., *E. inundatum* Lasch, *E. Kochianum* G. Boeckel" (Focke). See *Journ. Bot.* 1887, p. 65, t. 273.

NOTE ON *ROSA HIBERNICA*.

By James Britten, F.L.S.

In the *Index Kewensis* the publication of *Rosa hibernica* is given as "Sm. Engl. Fl. ii. 393" [394] (1824). This is odd in view of the numerous earlier references given for the plant in the *English Flora*—Engl. Bot. t. 2196 (1810), Smith's *Compendium*, ed. 2, 78 (1816), Woods in *Trans. Linn. Soc.* xii. 222 (1817), and Lindley's *Monograph*, 82 (1820); to which may be added Ait. Hort. Kew. ed. 2, iii. 261 (1811), and Smith in Rees's *Cyclopædia* (1814–15). The name is usually attributed to Smith, who in his first publication of it in *Engl. Bot.* says:—

"Discovered many years ago in the county of Down, about Belfast harbour, where it grows abundantly, by our often-mentioned friend John Templeton, Esq., who consequently found himself entitled to the reward of 50*l.* so liberally offered by the patrons of botany at Dublin for the discovery of a new Irish plant. We adopt the name by which Mr. Templeton has communicated wild specimens to us, for the singularity of the anecdote, and that we may not rob him or his countrymen of a particle of their honours."

From the above quotation it is clear that the name was suggested by Templeton, but it seems to have been generally overlooked that he actually published it, with a full description and an excellent figure, in vol. iii. of the *Transactions of the Dublin Society*, pp. 162–164, where he says: "As it has not been before described,

I may perhaps be allowed to give it the name of Rosa Hibernica." The authors of the *Cybele Hibernica* seem to have overlooked this sentence, for (p. 119) they give "R. hibernica Smith" as the name of the plant, and say :—"First published in the *Dub. Soc. Trans.* iii. p. 162 (1802) [1803] and afterwards named *R. hibernica* by Smith in 1810."

The "reward of £50" is more correctly stated in the *Cybele* to have been "five guineas, Irish currency"; the entry in the Dublin *Transactions* (iv. 199) runs :—

"For producing Native Plants of Ireland not hitherto described.

		£	*s.*	*d.*
R. Scott, Esq., M.D., Professor of Botany, T. C. D.	Three new species of Mosses.	17	1	3
John Templeton, Esq.	A new species of Rose.	5	13	9"

The fruit on the E. Bot. figure of *R. hibernica* is from a drawing sent by Templeton to Sowerby with a letter, preserved in the Department of Botany, which is printed in the Supplement to this Journal for 1903, p. 64.

Scott published two of his mosses in the same volume of the *Transactions*, p. 158, with a figure of each, but these seem to have been entirely overlooked. The species—*Grimmia maritima* and *Dicranum Scottianum*—are usually cited as of Turner from his *Muscologiæ Hibernicæ Specimen* (1804), which is dedicated to Scott. It would appear however that the former should be attributed to Smith, to whom Scott sent it and who "aptly named it *Grimmia maritima*." The *Dicranum*, "to which the partiality of my ingenious friend Mr. Turner has affixed the trivial name *Scottianum*," was sent to Turner. The references to the species should therefore be :—

Grimmia maritima Sm. ex Scott in Trans. Dublin Soc. iii. 158 (1803).

Dicranum Scottianum Turn. ex Scott, *l. c.*

Scott's third plant is altogether doubtful ; it may as he suggests be a *Rivularia*.

Turner (*op. cit.* vi.) makes special acknowledgement of the help he received from Scott and Templeton, to the former of whom he dedicates his book, which he says was begun at his suggestion :—"Viris amicissimis, Roberto Scott, M.D. Botanices, Eblanæ, Professori, W. Stokes, M.D. Sacro-Sanctæ Trinitatis Collegii Socio, Historiæ Naturalis cultori indefesso, et Johanni Templeton, Arm. qui, Hiberniæ septentrionalis incola, regionem illam montosam et naturæ opibus abundantem labore improbo indagavit, et a quo Flora Hibernica mox est expectanda, summas et habeo et ago gratias."

SHORT NOTES.

Fertility of Senecio albescens (S. Cineraria × Jacobæa).—In the Rev. E. F. Linton's valuable paper (p. 274) the fertility of *Senecio albescens* is set down as unproven. Mr. Linton has overlooked the following passage on page 113 of the *Flora of County Dublin*, published three years ago, where the question is set at rest:—"The Killiney Bay hybrid produces perfect fruit in small quantity. Of five plants which I have grown from its seeds, gathered on the sea-cliffs near Vico in 1902, one retained all the prominent characters of the hybrid, while the others approached in varying degrees more closely to *S. Jacobæa*." In further proof of the fertility of this natural hybrid between a native and an alien species of *Senecio* it may be of interest to mention that I have produced a second generation of the plant. Seeds gathered in 1905 from a hybrid grown in my garden, and itself the product of seed taken from a hybrid parent in its natural station at Vico, have proved fertile, and produced one strongly marked hybrid plant. This, unfortunately, died after reaching a height of three inches, so that I have been unable to raise a third generation of the hybrid.—Nathaniel Colgan.

Ecology of Montia fontana L. (p. 211).—Although the habitat of this widely diffused plant is typically as Mr. L. H. Riley has described it above, yet, in its two forms, *minor* All. (*erecta* Pers.) and *major* All. (*rivularis* Gm.—*repens* Pers.), it is able to live and maintain itself in many varying conditions of dryness and moisture. The enumeration of the following localities from my own herbarium should suffice to confirm this statement. 1. Swampy place on a common, Staffordshire; 800 ft., in shallow stagnant water. 2. Edge of a small pond on the top of the cliffs of Moher, 500 ft., Co. Clare; swampy pond-edge, with *Peplis portula* 3. Edge of a pond, Aldershot, Hants. 4. Six inches long, growing in a bog, not on *Sphagnum*, in Denbighshire, 900 ft. 5. In a mountain rill, Monmouthshire. 6. In a damp place on a hillside, 600 ft., Salop. 7. On the top of a dry hill, 900 ft., the Buckstone, West Gloster, on Old Red Sandstone Conglomerate, in short turf, with heather, gorse, *Polytrichum juniperinum*, &c. Mr. West remarks (p. 282) that *Montia* does not grow in bogs. It might be well to limit that assertion to "on *Sphagnum*," or "in *Sphagnum*-bog."—Eleonora Armitage.

Phleum pratense L. var. præcox Jord.—In June 1905 a very well-marked variety of *Phleum pratense* was found on the limestone at Cave Dell, Castleton, Derbyshire. This proves to be var. *præcox* Jord.—E. Drabble.

The Koeleria of Ben Bulben.—In the *Memorials of Babington* a reference is made to the "Koeleria on Ben Bulben supposed to be *valeriaea*" [sic]. In the index this is altered to "*valesiaca*." I may say that through the kindness of the Curator I have seen the specimen in Babington's Herbarium from Ben Bulben and find it is not *K. valesiana*, but is similar to the plant which I

gathered on that range last September, and which is now being examined by Dr. Domin. It belongs to the *gracilis* section, and is not the common British form.—G. Claridge Druce.

Schœnus nigricans L.—It may be of interest to report that in July 1906 this plant was found by me between Clevedon and Portishead, whence it was recorded in 1842. It is of rare occurrence in Somerset, and has long been supposed to be extinct in the above locality.—Mary A. G. Livett.

NOTICES OF BOOKS.

Der Einfluss des Klimas auf den Bau der Pflanzengewebe. Von Dr. Carl Holtermann. Pp. 244, 16 plates. Leipzig: W. Engelmann. Price 12 marks.

This work, extending to 244 pages, will be somewhat of a disappointment to him who purchases it in the expectation of reading a general account of the effect of climate upon plant-structure, and even the sub-title "Anatomisch-Physiologische Untersuchungen in den Tropen" will not prepare the reader for the fact that the book almost exclusively deals with the results of some observations made in Ceylon.

Prof. Holtermann has evidently imitated A. F. W. Schimper's style of work and drawn largely upon that botanist's ideas, but hardly with success or adequate appreciation. Schimper had an artist's gift of setting forth the main facts of his case to produce a bold and true picture, and of avoiding excessive detail. But in attempting the same method Prof. Holtermann seems to mistake important points for trivial details; for instance, after attacking Schimper's view that the vegetation near the sulphur springs of Java are xerophytic, he states that the amount of salts present is often insufficient to evoke xerophily, that analyses of the various springs are presumably in existence, and that the chemical composition of the fumaroles is not such as to evoke protective devices against transpiration. Yet he gives no convincing illustrations, on analyses of the soil, and no evidence against the quite probable possibility that minute doses of sulphur dioxide can evoke xerophily. Again, he makes the interesting statement that a detached shoot of *Cyanotis fascicularis*, when laid on a table, gradually withered during the day, but recovered its fresh appearance and turgidity during the night. From this he concludes that the shoot absorbed dew. Yet there is no evidence supplied that the shoot increased in weight during the night, nor that the regained turgescence was not due to mere transference of water from the aqueous tissue to the green cells, nor that there are any cells capable of absorbing dew. Later on, Prof. Holtermann goes on to say that in Ceylon there are various plants possessing aqueous tissue, and having a power of absorbing dew and of thus gaining in weight. The proof of the prevalence of such a widespread utilization of dew would have been a notable addition to our knowledge

of plant-life in the Tropics, yet neither names of plants nor statistics are given. Yet one more case may be cited. After describing and figuring quite familiar devices for bud protection—including coatings of hairs and of wax-like substances, young stipules, leaf-sheaths, concave petiole-bases, peg-like ridges at the bases of leaves—the author goes on to say: "In *all* these protective devices I have been able to establish the fact that when they are artificially removed the buds dry and die. . . ." This experimental evidence was just what was required, but how to accomplish it without incidental injury to the protected parts defied previous investigators. Yet Prof. Holtermann does not tell us by what extremely ingenious methods he contrived to remove the delicate film of wax or hairs, or the tiny pegs of *Alstonia*, and the like. In fact, throughout the book the author fails to be convincing.

Though scattered about the book are interesting isolated observations that seem to be new, very much of the text, even the spaced text, is already well known, as would be recognized if the literature were more fully cited.

The first fifty pages deal with climate in Ceylon, and give some useful quantitative statistics on transpiration.

The next Section commences with the consideration of mangrove vegetation, and a number of surprising statements are met with. We are told that most botanical writers regard aqueous tissue as a means of depressing transpiration, and stress is laid upon the very familiar fact that in reality its function is to prevent green cells from dying. But the main object seems to be to show that Schimper exaggerated the structural features devised to depress transpiration. Here the author had a chance of testing his view by including detailed measurements of transpiration; but, although measurements are given (in the preceding Section) of transpiration in *Rhizophora* and *Avicennia*, they are accompanied by no particulars as to temperature and atmospheric humidity, so that comparison might be made with inland plants in connection with which these details are, however, supplied. The statistics supplied conclusively demonstrate that in the experiment performed transpiration was, as a matter of fact, very slow. Among the curious statements designed to show the absence of histological protection against transpiration are the following: In *Rhizophora conjugata* the stomata are sunken, occur only on the lower face of the leaf, have strongly developed cuticular ridges, but are "not xerophytic in character"! *Bruguiera gymnorhiza* is described as having a thick cuticle, but not so thick "dass ich, wie Schimper, dies besonders betonen möchte"! Again, in his eager attack on Schimper's view that the xerophytic structure is partly designed to prevent a poisonous accumulation of salt in the green cells, Prof. Holtermann confidently adopts the possibly incorrect and improbable assumption "that the cell-sap of all the cells of the leaf is equally concentrated as regards common salt," and further sustains his argument by informing us that no European halophytes washed by sea-water have means of depressing transpira-

tion ; and he even instances *Salicornia herbacea* to support his view !

These examples suffice to show the unconvincing nature of the book, which continues with consideration of the vegetation of the *solfataras*, sea-shore, inland forests, *patanas*, parasites, and epiphytes, among which are isolated facts that are both interesting and new. (Incidentally a novel view of priority is taken when Mr. Boodle's already published observations on *Pteris* are quoted as subsequent to the author's, and later a similar original conception is brought out in reference to Mr. Wright's suggestive work on leaf-fall.)

Upon leaf-fall and periodic growth in thickness of wood, Prof. Holtermann adds nothing, so far as the reviewer can see, novel in idea or in fact. He records a pretty observation made by Mr. Carruthers, who noted that a chocolate-tree seven years old showed twenty-two rings of growth and had cast its leaves thrice a year. Prof. Holtermann, in reference to the production of wood-vessels at the beginning of the vegetative season in tropical trees, adopts the familiar theory put forward by Hartig in connection with temperate trees ; but he restates it (in spaced type) in manner too narrow and dogmatic, thus : "At the commencement of the vegetative season it is absolutely necessary for new conducting channels to be produced rapidly, since the tracheal elements, which sufficed for the old leaves, are no longer sufficient, because the transpiration has materially increased. In addition the branches commence to grow, and in a very short time the mass of foliage is considerably larger than formerly." This proposition is nothing more than an assumption, because it neglects two facts : first, the amount of water stored in the wood of the tree ; secondly, the possibility that the tree may perhaps, by increased rapidity of current, temporarily do without any sudden increase in channel. Later on, Prof. Holtermann makes an astounding misstatement in reference to a suggestion due to Hartig, to whom he attributes the opinion that there is "a connection between the formation of annual rings and the production of heart-wood"; and then he laboriously proceeds to overthrow this obvious delusion. Hartig, of course, never sought to establish any such relation, but he did show that those temperate trees which produce heart-wood, and in which the conducting channel consists of a few annual rings, the so-called "spring zone" is especially porous, and did ingeniously suggest that this is due to a sudden call for water-conducting elements.

In the final Section dealing with "Direct Adaptation," we find at the outset the same peculiar perspective in regard to the work of other botanists. In opening the discussion on the effect of changed habitat on halophytes the author has to agree in results with Schimper, yet without any justification he suggests (once more in spaced type) that certain of Schimper's observations on *Sonneratia acida* were possibly not made on that plant at all. Again, in reference to Schimper's statement regarding stone-cells in *Scævola Koenigii*, he says, "I cannot definitely contradict this assertion," and adds that he could not find stone-cells in this

plant, but did find them in *S. Plumieri*. What plant does Prof. Holtermann mean by the latter? One species known as *S. Plumieri* is identical with *S. Koenigii*, another species known as *S. Plumieri* is quite a different plant. This final Section of the work contains a number of examples of the direct effect of environment upon plant-structures, but no material contributions to the knowledge of "direct adaptation."

In fact, the book, with its preconceptions, its hasty conclusions, its incomplete evidence, and its treatment of previous workers, seems to belong to the class "in which the voice of intention makes itself heard beneath the mask of insight" (Schopenhauer).

PERCY GROOM.

Lectures on Plant Physiology. By Dr. LUDWIG JOST. Translated by R. J. HARVEY GIBSON, M.A., F.L.S. Oxford: Clarendon Press, 1907. Pp. 564. 21s. net.

JOST'S *Vorlesungen uber Pflanzenphysiologie*, which appeared in 1904, is recognized by all students of vegetable physiology as a work of great and permanent value. Less exhaustive than Pfeffer's treatise it is nevertheless a masterly summary of our knowledge of this subject. It has, moreover, qualities of lucidity and precision which place it in striking contrast with Pfeffer's more elusive pages. A translation of Jost was therefore to be desired, and it is fitting that the desire should be met by the Clarendon Press to whose enterprise botanists are already so indebted.

The English translation by Professor Harvey Gibson occupies 564 pages, about 130 pages less than the original. This compression is secured at the expense of the reader; for so close-set are the lines that it is not easy to follow their sequence.

The illustrations are old and worn. Many are from well-known sources such as the Bonn text-book and are certainly, so far as English students are concerned, superfluous. The inky-black pitcher plant (p. 185), the figures of *mitosis* (p. 268), the blurred Mimosa (p. 513), may be cited as examples of the many figures which, unlovely in their present state, might be dispensed with altogether.

The cover bears the title "Jost's Physiology. Gibson," and therefore encourages the hope that the German text of four years ago has been edited and brought up to date. This hope the title-page and translator's preface dispel. Professor Gibson states that he has not attempted to edit Dr. Jost's pages and that he has, at the author's request, endeavoured to translate the German text as literally as possible. These decisions are to be regretted, and it is doubtful whether the work was worth doing on these terms; for, on such terms, it is hardly possible even to do justice to the book itself, still less to remedy its defects.

Occasional sentences in square brackets by the author do not succeed in bringing the book up to date. Thus the chapter on assimilation contains no reference to Usher and Priestley's work nor to the recent researches of F. F. Blackman. Neither in the bibliography to the chapters on Heredity and Variation, nor in the

chapters themselves, is mention made of such names as those of Galton, Bateson, Pearson, Biffen, Punnet, Sanders. The student is referred to no modern English or American work on Genetics, not even to De Vries' "Species and Varieties, their Origin by Mutation." The brilliant work of the Third Report is ignored, and we are told that "Mendel's law of segregation is however not of universal application. There are hybrids which do not segregate, and also others which segregate in different proportions." The segregation of hybrids would provide a Mendelian night's entertainment.

The subject of manuring with artificial manures receives nineteen lines. Kainit is written "cainite" (p. 101). Phosphoric and nitric acids are said to be amongst the chief manures. Basic slag is referred to by the name in use in Germany, and it is stated with respect to lime that "one need never fear a deficiency of that mineral in agriculture." The bibliography ignores Rothamstead, and is silent as to Hall; but refers the student to Meyer's 'Agricultural Chemistry' 1895. When omissions such as these occur in a German work the Englishman says nothing; but when they come home to him in a translation he protests, and rightly protests. Our tributary to the stream of physiological research may be small; but its place must be marked on any map published in this country.

The actual translation is fairly, but not wholly, satisfactory. Growing point (p. 285) instead of growing-point is not a happy innovation. "The inward significance of manuring" (p. 101) illustrates a tendency to the use of unnecessary words. "Transformation of form" (p. 1) is not elegant. "Vines treated with copper" (p. 88) should probably read "treated with a copper salt," since it appears from the next sentence that it is a solution which is used; past and present tenses rub shoulders uncomfortably in the sentences which follow. More serious objection must be taken to the employment of the word metamorphosis as the equivalent of the German "Formwechsel." The word is already heavily weighted with meaning, is rich in historical association, and is too old to bear new meaning for the expression of which good words already exist. A reckless use of italics—as many as seventeen per page—is a feature of the book; adjectives seem to be specially, though not exclusively, favoured in this respect.

FREDERICK KEEBLE.

BOOK-NOTES, NEWS, &c.

THE Editor, Mr. Carleton Rea, is to be congratulated on the appearance of the *Transactions of the British Mycological Society* for the season 1906 (Worcester, 1907, pp. 133–189, 3 coloured plates). He opens with the usual account of the Autumn Foray, which this year took place in Epping Forest. The season, previous to the 1st October, had been a very dry one; but the week's examination yielded no fewer than three hundred and thirty species of fungi, and of these fifty were additions to the list for Epping Forest. The President, Mr. Arthur Lister, F.R.S., begins

his address by giving some delightful historical notes on the Forest, and then takes up the subject of Mycetozoa, describing in turn the methods of spore dissemination and germination, the life of the swarm-cells, and the development and cytology of the plasmodium. A valuable paper is contributed by M. Emile Boudier, an honorary member of the Society, entitled, "Quelques Rectifications et Observations sur les 'Illustrations of British Fungi' de Cooke." The writer pays a high tribute to the excellence of the plates and gives notes on many of the figures, on the nomenclature, form, and colour of the fungi. His remarks are replete with interest to all who have worked with the "Illustrations." The Editor has supplied, from his intimate knowledge of living forms, a most helpful paper on "How to distinguish the species of British *Lycoperda* in the field." He takes up each character in succession and lists the species under the different character-groups. The paper is a decided boon to field-workers, who have not found *Lycoperdon* an easy genus to deal with; but it would have been more readily helpful if it had been arranged in tabular form. Papers by W. B. Allen on *Trametes rubescens*; by A. D. Cotton on British *Clavariæ*; and by Carlton Rea on *Ozonium*, are also included, as well as the usual list of "Fungi new to Britain." A number of these are also new to science, and have been figured by Mrs. Carleton Rea, to whom the Society is again much indebted. The present number forms the close of the second volume, and an index of this and previous parts is appended, along with a list of members of the Society.—A. L. S.

We have received lately some further communication on the American Gooseberry Mildew. The Board of Agriculture have issued a new leaflet (No. 195) representing with pen and pencil the serious nature of the disease, and urging growers to be on the look-out for the first symptoms of attack. "The disease," we are told, "first appears as a delicate white mildew on the expanding leaf-buds, extending later to the young wood and fruit." In another paragraph: "The disease is of a very serious character, and has rendered the culture of gooseberries unprofitable wherever it has appeared, and in some cases even impossible"; but the consoling statement is added, "In this country the fungus appears to be mostly confined to the tips of the shoots." The Board of Agriculture does not yet seem quite sure that the disease is very harmful. A pamphlet by Mr. E. S. Salmon, *The American Gooseberry Mildew*, issued by the South-Eastern Agricultural College, speaks with no uncertainty. The author is fighting the apathy of growers and of people with authority. His aim is to induce the Board of Agriculture to carry out the following measures: (1) the prohibition of all further importation of diseased gooseberry stock; (2) the compulsory destruction of all diseased bushes, compensation being paid where necessary. Mr. Salmon again describes the appearance of the disease, and gives advice to those growers whose bushes have been attacked already.

We have received the Report of the Watson Botanical Exchange Club for 1906–7, from which we hope at a future date to publish some extracts.

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EDITED BY

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CONTENTS

PAGE

Notes from the National Herbarium.—I. 313

Additions to the Flora of Herefordshire. By the Rev. Augustin Ley, M.A 317

Alabastra Diversa.--Part XV. By Spencer le M. Moore, B.Sc., F.L.S. (continued) 329

On the Disappearance of Cryptogamic Plants. By A. R Horwood 334

Notes on British Rubi (*Suberecti*). By Edward G. Gilbert, M.D. .. 339

Short Notes. — *Aceras anthropophora* R. Br. in North Somerset. —*Ophrys Trollii* Hegenb. — *Orchis ericetorum* Linton. — Gall Formation in *Ramalina*. — New Localities of Rare Lichens.—*Scutellaria alpina* L. — The Box in England.—*Rosa hibernica*. — *Silene conica* in Surrey 343

Notices of Books:—

Flowers of the Field. By the Rev. C. A. Johns, B.A., F.L.S. Revised throughout and edited by Clarence Elliott 347

Wild Flowers of the British Isles. Illustrated and written by H. Isabel Adams, F.L.S. Revised by James E. Bagnall, A.L.S. .. 347

Manual of British Grasses. By W. J. Gordon 347

Die Purpurbakterien. By Hans Molisch 350

Book-Notes, News, &c. 351

Supplement. — A Flora of Glamorganshire. By H. J. Riddelsdell, M.A. (continued).

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NOTES FROM THE NATIONAL HERBARIUM.—I.

[Under this heading it is proposed to publish items of information which accrue during work in the National Herbarium, and which it seems worth while to place on permanent record, as elucidating the history of some of the plants contained therein, and specially of the older types. The Notes will be contributed by members of the staff and others; those forming the present instalment are by Mr. Britten.—Ed. Journ. Bot.]

"Camellia axillaris Roxb." The plant figured under this name in Bot. Reg. 349 and Bot. Mag. 2047 (both in Feb. 1819) is, as pointed out by Dyer in Journ. Linn. Soc. xiii. 330, *Gordonia anomala*. The diagnosis preceding Ker's description (Bot. Reg. 349) is latinized from "Roxburgh MSS. in MSS. Banks conservato"; Dyer (*l. c.*) says "I have tried to trace this MS. in the Banksian Library, but without success"; it is however the MS. *Flora Indica* mentioned in this Journal for 1902, 420, which Ker frequently consulted; the description, which is in Roxburgh's hand, is taken from vol. ii. p. 1522**. Sims quotes the same description as from "Roxb. fl. Ind. inedit.," but does not mention the Banksian library. The word "downy" is rendered by Ker "sericeo," by Sims "villoso." According to Ker, it was introduced by Roxburgh from Pulo-Penang to the Calcutta Garden. Dyer (*l.c.*) says "if it was obtained from Penang, it can only have been from a garden"; this may well have been the case, although Roxburgh distinctly says "a native of Pullo-pinang."

Ceratites amœna Solander ex Miers Apocyn. S. Amer. 18, t. 1c. When revising our *Apocynaceæ* I came across this plant, which was first published by Miers (*l.c.*). Its general appearance at once suggested that it did not belong to the order, and a closer inspection indicated *Rubiaceæ* for it. Mr. Spencer Moore examined the specimens and identified it with *Rudgea eriantha* Benth., a plant collected by Gardner and, curiously enough, by Miers himself, who rightly identified it and whose specimen is accompanied by a pencil drawing of dissections of the flower. It must however be remembered that the memoir on the *Apocynaceæ* was Miers' last work, published in his eighty-ninth year, and that it contains abundant evidence of failing memory. A careful examination of the National Herbarium, on which it is largely based, has failed to bring to light plants stated by the author to have been seen by him therein; while in the printed account the words "non vidi" are in several cases appended to descriptions of plants which Miers himself wrote up in the Herbarium. *Ceratites* is duly retained in *Apocynaceæ* by Schumann (Engler & Prantl, iv. 2, 144), and no doubt seems to have been hitherto expressed as to its position.

Crepis præmorsa Tausch. Babington includes this plant in his Flora of Iceland (Journ. Linn. Soc. xi. 315) with the following note: "Solander states that he found it at Hafnarfjord. It is included in all the lists from the time of König; but no localities

are recorded. Vahl doubts its claims to be in them." Babington did not consult the small collection of drawings of the Iceland plants made for Banks by J. F. Miller, who accompanied him on the voyage to Iceland in 1772; had he done so he would not have failed to identify the figure named by Solander *Hieracium præmorsum* with *H. cæsium* Fr., of which Banks and Solander's specimen—not mentioned by Babington—is in the Herbarium. It may be worth while to give a list of Miller's sketches—of *Hieracium cæsium* and the forms of *Gentiana campestris* finished drawings from the sketches were made by Thomas Burgis—*Ranunculus hyperboreus* Rottb., *Arabis petræa* L., *Saxifraga hypnoides* L., *S. nivalis* L., *Leontodon autumnalis* L., *Hieracium cæsium* Fr., *Erigeron alpinum* L., *Gentiana campestris* L., *Kœnigia islandica* L. Of the Gentian two forms are figured—one with white or flesh-coloured flowers, the other of a red-purple hue throughout, including the blossoms. The specimen of *G. tenella* in Solander's collection is, as Babington says (*l. c.* 318), labelled *G. Œderi*, but not in Solander's hand, although the name is assigned to him in the *Index Kewensis*.

CYRTANDRA GLABRATA ("Solander [Dryander] MS. in h. Mus. Brit.") C. B. Clarke Monogr. Cyrtandr. 277. This species as described by Clarke is founded on specimens collected by Cook in Tahiti in 1775. The name (written *glabra*) was originally applied to a plant collected by Banks and Solander, of which there is a full description in Solander's MSS. and a drawing by Parkinson (*glabrata*). Dryander included Cook's plant under the same name, and it is this latter which must be considered as the type of *glabrata*; the Banksian specimens are referred by Clarke to *C. biflora* Forst.

DICLIPTERA FRONDOSA Juss. Under this Seemann (Fl. Vit. 183) places "*D. floribunda* Sol. Prim. Fl. Ins. Pacif. (ined.) p. 203," of which he transcribes the description. There being no specimen of *D. frondosa* from Banks and Solander, I suspected some confusion, especially as Seemann refers to a Banksian specimen of *D. clavata* (*Diforstera* Baill.) which does not appear in the copy of Prim. Fl. Ins. Pacif. which Seemann consulted. A reference to the rough draft in Solander's hand shows that the name of the plant originally described therein as *floribunda* was subsequently changed by him to *clavata*—an alteration overlooked by Sigismund Bacstrom when transcribing the MS., or possibly made after the transcription. The entry under *D. frondosa* in Fl. Vit. should be restricted to the words "from Tahiti (Forster! Wiles and Smith!);" the synonymy and description belong to *D. clavata*.

ERINUS FRUTESCENS Mill. Dict. ed. 8, n. 4, is the type of *Capraria cuneata* Ait. Hort. Kew. ed. 2, iv. 47—usually cited as of R. Brown, although his name is in no way connected with it in Hort. Kew. It is identical with *C. saxifragæfolia* Schlecht. & Cham.—the name adopted in Bot. Biol. Centr. Amer. and elsewhere. If the plant be retained as distinct from *C. biflora* the name and synonymy will be as follows:—

CAPRARIA FRUTESCENS, comb. nov.
Erinus frutescens Mill. Dict. ed. 8, n. 4 (1768), et in Herb. Mus. Brit.!
Capraria cuneata Ait. Hort. Kew. ed. 2, iv. 46 (1812).
C. saxifragæfolia Schlecht. & Cham. in Linnæa v. 105 (1830).
Pogostoma saxifragæfolia Schrad. Ind. Sem. Hort. Gott. (1831) ex Benth. in DC. Prodr. x. 430.

Miller's plant was collected at Vera Cruz by Houstoun.

ERINUS TOMENTOSUS Mill. Dict. n. 2, is retained in the Kew Index, but is reduced by Bentham (in DC. Prodr. x. 383) to *Stemodia lanata* Ruiz & Pavon, which must be called S. TOMENTOSA. This was also collected at Vera Cruz by Houstoun.

LEUCÆNA FORSTERI Benth. Bentham (Hook. Lond. Journ. Bot. v. 94) rightly bases this species on the *Mimosa glandulosa* of Solander in Forster's *Prodromus*, p. 92, no. 565 (nomen), on the faith of specimens from George Forster, written up by him with that name and number in the National Herbarium. Seemann (Fl. Vit. 73) refers to these specimens, but says that the name "is not taken up in Solander's MS. Flora of the Society Islands." Perhaps by this he means that the name is therein misapplied, for it is certainly there (p. 349). But the description shows that it there refers to *Serianthes myriadenia* Planch., and this is borne out by the fact that the same plant in the Banks & Solander collection bears the name *Mimosa glandulosa*. *Leucæna Forsteri* (the *M. glandulosa* of Forster) is described on the same page of the MS. as *M. littorea* and the specimens are labelled by Solander *M. littoralis*. Neither is mentioned by Seemann as having been collected by Banks & Solander.

LYSIMACHIA PACIFICA F. Muell. Phyt. N. Hebr. 18. This name appears in Pax and Knuth's monograph of *Primulaceæ* in *Das Pflanzenreich* (p. 312) among the "species non visæ." It is the *Lubinia pacifica* of Seemann (Fl. Vit. 147)—a name not cited in the work referred to, but quoted in the *Index Kewensis* with "(nomen)" attached. I think however that the plant is described, although the way in which the description is worded leaves this open to doubt. Here is the passage: ". . . *Lubinia pacifica* Seem. sp. nov. in Herb. Mus. Brit. from the Isle of Pines (M'Gillivray!). The latter has quite the habit of *L. spathulata* Vent.; spathulate entire, dotted and membranous leaves, axillary solitary flowers, and calyx segments densely covered with black dots. The flowers seem to be white. Calyx-segments ovate-oblong, acute." I have examined the specimen in the National Herbarium, which does not appear to differ specifically from *L. spathulata* (*L. mauritiana* Lam.), although it is more lax in habit than any specimens of *L. mauritiana* that I have seen. It may be noted that *L. tenella* Wall. Cat. n. 1491, referred by Pax & Knuth doubtfully to *Centunculus minimus* is, according to the specimen in the National Herbarium, *Anagallis pumilus*.

"MARATTIA TERMINALIS Soland." This name is given by at least two authors—Drake del Castillo (Illustr. Fl. Ins. Mar.

Pacif. 164) and Pampanini (in Annali di Bot. ii. 92 (1905))—as a synonym of *Weinmannia parviflora* Forst., in this following Seemann (Fl. Vit. 109) who first printed the name. A comparison of Parkinson's drawings of Tahiti plants, from which the name is said to be taken, shows that Seemann erroneously transcribed it. Solander wrote *Merretia*, intending no doubt to commemorate Christopher Merrett (1614–95), after whom he subsequently named *Merretia lucida* (*Corynocarpus lævigata* Forst.). Neither *Marattia* nor *Merretia* will be found in the *Index Kewensis*, from which, by a curious oversight, all the numerous names of Banks & Solander given as synonyms in Sir Joseph Hooker's *Flora Novæ-Zelandiæ* are omitted.

SARCOCEPHALUS SAMBUCINUS K. Schum. in Engl. & Prantl, Nat. Pflanzenf. IV. 4, 59 (1891). In his note on this plant in Bull. Herb. Boiss. vii. 377 (1907) Mr. F. N. Williams says: "The identity of the plant can be traced from the type specimen in the University of Upsala, which is the actual Sierra Leone specimen received by Afzelius from Winterbottom in 1798." Mr. Williams appears to have assumed the existence of this specimen from Haviland's remark in Journ. Linn. Soc. xxxiii. 4 (1897) and to have overlooked my correction in this Journal for 1897, p. 338. As I have there shown, the type-specimens are in the National Herbarium; there is no reason to suppose that Winterbottom ever collected any plants, and the specimen in Afzelius's own herbarium at Upsala bears a different name (see Journ. Bot. *l. c.*). There is indeed no evidence that Afzelius ever called it *Sarcocephalus esculentus*, as stated by Sabine (Trans. Hort. Soc. v. 442); his specimen in the National Herbarium is named generically by Dryander, and J. J. Bennett added the trivial.

TACSONIA MICRADENA DC. Prodr. iii. 334. This species is retained as distinct by Masters (in Fl. Bras. xiii. 538 and in Trans. Linn. Soc. xxvii. 628), who, however, says he has not seen it. He did not recognize that it is identical with *T. Purupuru* DC. MSS. which he refers to *T. pinnatistipula* Juss. in both the papers cited and also on Pavon's specimen in the National Herbarium (from Herb. Lambert); on this De Candolle founded the species published by him as *T. micradena* and on which, following Pavon's MS. name, he wrote *T. Purupuru*.

T. PINNATISTIPULA Juss *β.* PENNIPES DC. *l. c.* This name is erroneously attributed to Smith by Masters (*ll. cc.*). Smith, however, intended the name as a synonym of *P. pinnatistipula* Cav.—"an uncouth name" which "with great reluctance we have been obliged to alter." The plant of Menzies cited by Smith was separated from *pinnatistipula* as a variety (*pennipes*) by De Candolle; this was raised to specific rank under *Tacsonia* by M. J. Roemer (Syn. Pepon. 194), to whom the *Index Kewensis* erroneously attributes *P. pennipes*. The variety stands as:

TACSONIA PINNATISTIPULA Juss. *β.* PENNIPES DC. Prodr. iii. 334.

Passiflora pennipes Sm. in Rees Cyclop. xxvi. n. 48 (1813), in part (1828).

T. pennipes M. J. Roem. Syn. Pepon. 194 (1846).

ADDITIONS TO THE FLORA OF HEREFORDSHIRE.

By the Rev. Augustin Ley, M.A.

The following notes deal with plants unrecorded for the county in the *Flora of Herefordshire* published in 1889, in "Additions to the Flora of Herefordshire" (Journ. Bot. 1894, 207), or in "Herefordshire Rubi" (Journ. Bot. 1896, 155). Notices are also inserted of a few plants already recorded for the county if deemed of sufficient general interest. The writer offers thanks to the Rev. W. M. Rogers for untiring aid in *Rubus*, and to Rev. W. R. Linton for invaluable help in *Hieracium*; to Mr. E. G. Baker for assistance in the Pansies and Roses; to Messrs. R. Towndrow, Spencer H. Bickham, Miss E. Armitage, Mr. Winterbourne, of Leominster; last, not least, to Rev. C. H. Binstead, late Vicar of Breinton, now of Whitbourne, without whose diligence and knowledge the additions to our moss list would have been few and meagre. Unless where otherwise stated, the records stand on the authority of the writer of the paper. † is prefixed to plants thought to be introduced, and * to those unrecorded for the county at the places mentioned above. In nomenclature and order, the flowering plants follow the *London Catalogue*, ed. ix.; for *Rubus*, Mr. Rogers's *Handbook*; for *Hieracium*, Mr. W. R. Linton's *British Hieracia*; for the Mosses, Mr. Dixon's *Handbook Catalogue* have been used.

Ranunculus Lenormandi F. Schultz. Bog in the Queen's Wood, Gorsley, 1898. The only record for the plant except on the high moorland of the Black Mountain.—*Caltha palustris* L. *var. *latifolia* (Schott). Observed at Sellack and King's Capel in the south, and at Lyonshall in the north of the county. Doubtless general.

Fumaria densiflora DC. Ross, 1897, *Mr. H. Southall*! Ledbury, *Bickham*.—*F. pallidiflora* Jord. Garden weed at Ross, 1871, *Herb. Purchas*! Weston-under-Penyard, 1898; confirmation of the old record for the same station in 1849.—*F. *purpurea* Pugsley. Fownhope, 1871, *Herb. Purchas*! Lyonshall, in abundance, 1902.—*F. Boræi* Jord. It seems probable that far the larger portion of the capreolate Fumitories of the county fall under this aggregate. The writer has plants which he assigns to the type from Ludford Park, to *var. *ambigua* Pugsley from King's Capel, to *var. *muraliformis* Cl. from St. Weonards and Huntsham.

*Barbarea *arcuata* Reich. After many years of watching and cultivation of these plants, the writer feels justified in publishing the following localities as, in his judgement, undoubtedly belonging to this species:—Ross, wall-top at the Cottage Hospital, 1895, and subsequent years; King's Capel, in a grass-field, 1902. The pod in this plant is usually thicker and shorter than in *B. vulgaris*.

*Lepidium *ruderale* L. Waste ground at Colwall, 1906, *Bickham*!

*Reseda *lutea* L. Colwall, 1896, *Miss Roper*!

Viola **segetalis* Jord. Tillage at Sellack, 1906.—*V.* **Paillouxii* Jord. Tillage at Brilley, 1905.—*V.* **pallescens* Jord. Tillage at Sellack, 1865.—*V.* **sepincola* Jord. (*V. odorata* × *hirta*, *subodorata*). Far more rare than the cognate hybrid *V. permixta* Jord. Cherry Wood, Fownhope, with white flowers, 1877. Other examples probably to be referred to this hybrid have been found at St. Weonards (1875), Colwall (1885), *Mr. R. Towndrow* !, and Great Doward (1893).—*V. sylvestris* Reich. The statement in the *Flora of Herefordshire*, that this violet is less common near Ross and in other parts of the county than *V. Riviniana* Reich., has been shown by longer experience to be incorrect.—*V. tricolor* L. Native in hilly pastures in the north-west of the county. The following segregates have been identified with some certainty :—

V. **monticola* Jord. Tillage, Brilley, 1905; a very large-flowered state, due probably to manuring of the soil. Under cultivation in poor soil the flowers become much smaller.

V. **Provostii* Bor. Tillage. St. Weonards, 1880; Great Doward, 1906.

V. **contempta* Jord. Upland pastures at Deerfold, 1882, and at Byton, 1902.

V. **hispida* Lam. Deerfold, 1871.

V. **carpatica* Bab. Shobdon Park, 1886.

V. **Deseglesii* Jord. Tillage. Hope Mansel, 1880; Sellack, 1905.

Polygala **oxyptera* Reichb. Dry hills, rare. Great Doward, 1890, 1894; Cusop Hill, 1898, *Rev. W. M. Rogers* ! Not extreme *oxyptera*, which would hardly be likely to occur in Herefordshire, but the plant of dry hills, which is nearer to *P. oxyptera* Reichb. than to *P. vulgaris* L.

Silene **nutans* L. Very rare in the county. "In the grounds at Wych Point, Malvern, apparently native," *Mr. A. J. Crosfield*.

Stellaria nemorum L. Damp river-side thicket at the Great Doward, in abundance, 1899, and subsequent years. This plant was certainly not to be found at this station in previous years; but, judging from its abundance, it must have arrived several years before 1899. — *S. media* Cyr. *var. *major* Koch. Colwall, 1895, *Towndrow* (as *S. umbrosa* Opitz.); Sellack; Great Doward, &c., 1901. No doubt abundant throughout the county, although previously unrecorded.

Claytonia †**sibirica* L. and *C.* †**perfoliata* Don. "These two are establishing themselves as weeds at Ledbury," *Bickham*.

†**Spartium junceum* L. In abundauce in a railway-cutting at Ledbury Station, *Bickham*. First noticed on the railway at Dymock, West Gloucester, whence it spread to Ledbury.

Trifolium repens L. var. **Townsendi* Bab. In turf at Moccas Park, 1904, *Bickham* ! Authenticated by Mr. Townsend.

Spiræa Ulmaria L. *var. *denudata* Bœnn. King's Capel, 1905, with the type. Probably widely distributed.

Rubus idæus L. var. *obtusifolius* Willd. In the garden at Walford Vicarage, 1896; apparently the form *rotundifolius* Bab.

R. plicatus W. & N. *var. *hemistemon* (P. J. Muell. ?). Bog in Lyonshall Park Wood, 1900.

R. **nitidus* W. & N. Shirl Wood, Eardisland, 1878.

R. affinis W. & N. Hackley Common, Sarnesfield, 1903.

R. carpinifolius W. & N. In hilly parts of the county, rare. Howle Hill in the south; Lyonshall and Presteign neighbourhoods in the north-west. The localities mentioned for this bramble in Journ. Bot. 1896, p. 156, in wet thickets must be transferred to *R. leucandrus* Focke. See below, under that species.

R. dumnoniensis Bab. In plenty in a rough pasture near Lyonshall, 1897.

R. **mercicus* Bagn. Foy parish near Ross, 1903.—*Var. *chrysoxylon* Rogers. In the north-west of the county; Mosely Mere near Kington, 1896; Almeley, 1901; Brilley, 1905.

R. villicaulis sp. collect., subsp. *rhombifolius* W. Sellack, 1904.

R. **sciaphilus* Lange. Llantywain, in Llangarren parish, 1886; wood border in the lower part of the Honddu Valley, Monmouthshire, 1903; hedge, St. Weonards, 1899.

R. **leucandrus* Focke. Recorded in Journ. Bot. 1896, p. 156, as *R. carpinifolius* W. & N. Widely distributed both in the south and north-west of the county.

R. thyrsoideus Wimm. Scattered thoughout the county. Lodge Grove, Bishopswood, 1896; Holme Lacy, 1896, and at Aconbury Common, 1904; Broxwood near Pembridge, 1902.

R. pubescens W. The typical plant at Howle Hill, near Ross, 1906.

R. macrophyllus W. & N. subsp. *Schlechtendalii* (W.). — *Var. *macrophylloides* Genev. Widely distributed in Herefordshire, especially in the north-west. Gorsley in the south-east; Whitfield Woods in the west; Shobdon, Aymestry, and Lyonshall in the north-west. — Var. *amplificatus* (Lees), Journ. Bot. 1896, p. 159, must be withdrawn. The plant there mentioned was typical *R. Schlechtendalii* W.

R. **amphichloros* P. J. Muell. In the centre of the county at two stations near Hereford, 1905.

R. **Questierii* Lefv. & Muell. Riggs' Wood, Sellack, 1894. Old pool-beds in Lyonshall Park; a form. The Sellack plant was typical; that at Lyonshall very untypical, but was attributed to this species by Rev. W. M. Rogers.

R. **Colemanni* Blox. Rare; only known at one station on the West Gloucestershire border. Bishopswood, 1891.

R. hirtifolius Muell. & Wirtg. *var. *danicus* (Focke). Thinly scattered over the county. Holme Lacy; Ullingswick; Presteign. First found, 1893. —*Var. *mollisimus* (Rogers). South and centre of the county. Welsh Newton; Little Doward; Bolston; Mordiford. First noticed in 1900.

R. leucostachys Schleich. *subsp. *leucanthemus* P. J. Muell.? Rare. St. Weonards, 1906.

R. **lasioclados* Focke. The typical plant seems to be rare throughout Britain. Howle Hill, near Ross, 1906.

R. ? **Lettei* Rogers. A bramble closely allied to this Irish form is abundant in Bolston Wood. The following careful note on this bramble has been prepared by Rev. W. M. Rogers:—"The Bolston

Wood plant seems nearer to *R. Lettei* than to *R. criniger* or *R. Gelertii*. From the very constant plant of Counties Down and Armagh [*R. Lettei*] it differs by closer pubescence on the stem, being in that one character most like *R. criniger*; by the leaf more open and widespread, with whitish instead of greenish-grey felt on the under surface, and with the terminal leaflet with longer, more gradually acuminate point and narrower base, the toothing also being deeper and more finely pointed; and by the much longer ultra-axillary panicle top. These characters, though not very distinctive when taken singly, give in combination a considerably different look in the two plants, and each form seems constant to a remarkable degree." First found in 1900.

*R. *adenanthus* Boul. & Gill. Rare. Carey Wood, Brockhampton, 1894.

*R. *Boræanus* Genev. Rare. Longclose Wood, Little Doward, 1904; Stanford Park, both in Herefordshire and Worcestershire, 1902.

R. cinerosus Rogers, *R. pulcherrimus* Neum. forma *setosa*, Journ. Bot. 1896, p. 157. Widely and thinly distributed. Woods near Aconbury; Monnington-on-Wye; Big Wood and Criseley Vallets, Whitfield.

R. mucronatus Blox. *form. *mucronatoides* Ley MS. (see *Handbook of British Rubi*, p. 55). This remarkable form or variety is widely distributed in the north-west of the county, and deserves mention in this paper. Corton Wood, Presteign (Hereford and Radnor); Peas Grove, Kington; Highmoor Wood, Almeley; Shirl Wood, Eardisland; Brilley; Pont Esgob in the Black Mountain. First found in 1884.

*R. *Gelertii* Frider. Equally common in the county with *R. criniger* Linton, with which it was combined in the paper on British Rubi in 1896. Little Doward; Eaton Bishop; Aymestry.

R. anglosaxonicus Gelert *subsp. *vestitiformis* Rogers. Locally abundant in the south-west, south, and east parts of the county, and in adjoining districts of Monmouth and West Gloucester.

*R. *melanoxylon* Muell. & Wirtg. Very rare in the county. Open common at Moseley Mere, near Kington, 1896. Scattered thinly over the neighbouring Welsh counties of Brecon, Glamorgan, and Carmarthen.

*R. *Drejeri* G. Jensen. Rather rare, and known only in uncharacteristic forms. Welsh Newton; St. Weonards; Caplar; Aconbury; Breinton; Winforton; Berrington.

R. radula W. subsp. *anglicanus* Rogers. Rare. Puttridge Lane, Ross, 1887, *Herb. Purchas*! Stations for this plant mentioned in Journ. Bot. 1896, p. 217, are now assigned to other species.

R. podophyllus P. J. Muell. As an aggregate plant, widely spread in the south of the county. St. Weonards, Welsh Newton, Llanrothal, and Ganarew; all in the south-west of the county.

*R. *Griffithianus* Rogers. Rare, and only in an untypical form. Carey and other woods in Brockhampton parish.

*R. *præruptorum* Boulay? Exclude the stations mentioned in Journ. Bot. 1896, p. 218. Wood borders, Upper Sapey, 1898;

both in Hereford and Worcester; in abundance. I am assured by Rev. W. M. Rogers that the Sapey plant is identical with the Dorset bramble to which this name has been assigned.

R. Babingtonii Bell Salt. *var. *phyllothyrsus* (Frider). More common than the type in Herefordshire. Great Doward, Walford, Aconbury, Yatton in the south and centre; St. Margaret's in the west.

*R. *Bloxamii* Lees. Very rare in Herefordshire. Ullingswicke, 1898, 1900.

R. fuscus W. & N. *var. *nutans* Rogers. Very local. Ivington, in abundance; Lingen; Byton. First noticed in 1891.

R. pallidus W. & N. var. *leptopetalus* Rogers, *R. Læhri* Wirtg. Journ. Bot. 1896, p. 219.

R. longithyrsiger Bab. *var. *botryeros* Rogers. Rare, but (as an aggregate species) widely distributed in the county. Great Doward; Putley; Shobdon; Whitfield Woods: these localities are in each division of the county.

R. fusco-ater W. Found in several stations in widely separated parts of the county. Bishopston Hill; Richard's Castle; Brampton Bryan; Garway Hill.

R. distractus Muell. & Wirtg. Westhide Wood, 1894; a plant answering with much exactness to Rev. W. H. Painter's Staffordshire plant thus named. See *Handbook of British Rubi*, p. 84.

R. Marshalli Focke & Rogers *var. *semiglaber* Rogers. Rare. Bishopswood in the south; Kington and Brilley in the north. First noticed in 1885.

R. viridis Kalt. Still one of the rarest Herefordshire brambles. Big Wood, Whitfield, 1897.

R. Bellardii W. & N. In abundance in a wood in Cowleigh Park, 1905. A hybrid—*fuscus* × *Bellardii*—in abundance in the same wood.

R. hirtus W. & K. The typical plant in Big Wood, Whitfield, 1906.—*Var. *flaccidifolius* (P. J. Muell). Woods on Howle Hill, Ross; first in 1885. Not known in any other station.

*R. *minutiflorus* P. J. Muell. Woods, local. Coldborough Park Wood, 1888; Big Wood and Timberline Wood, near Whitfield; woods near Peterchurch; near Upper Sapey, but just within the Worcestershire border. One of the most striking of our native brambles.

R. acutifrons A. Ley *var. *amplifrons* A. Ley. See Journ. Bot. 1902, p. 69. Up to the present (1907) unknown beyond the Big Wood, Whitfield, where this striking plant exists in great abundance.

*R. *tereticaulis* P. J. Muell. Very rare. Big Wood, Whitfield, at a single spot, 1905. Elsewhere recorded for Britain only from Sprowston, Norfolk.

R. dumetorum W. & S. *var. *raduliformis* A. Ley. Near Ross; Wormbridge; Brilley; Whitney, *Bickham*! First noticed in 1905. Probably widely distributed.—*Var. *triangularis* A. Ley. Rare and local. Upper Sapey Common; in Herefordshire, and more abundantly in Worcestershire. Recurring in Wyre Forest, near Cleo-

bury Mortimer Station (in Worcester).—*Var. *britannicus* (Rogers). Widely spread; very abundant in the hilly western districts, especially in the valleys of the Monnow and Craswall Brooks, but not confined to these parts. Great Doward in the south; Holme Lacy in the centre; Whitfield in the western parts.—Var. *diversifolius* (Lindl.) is more widely spread in the county than had been supposed, and is now recorded from seven or eight stations in different parts.

*R. *Bucknalli* White. Rare, and known in a single district only. Mordiford, and near Yatton; first in 1895. On these plants the Rev. W. M. Rogers remarks:—"Indistinguishable from *R. Bucknalli*, so far as panicle is concerned; but the stem is much less densely hairy, and lacks the resinous exudation characteristic of Mr. White's plant." Mr. White himself recognized the Herefordshire plant as his species. Recorded in Journ. Bot. 1896, 223, as *R. Balfourianus* Blox.

R. Balfourianus Blox. Certainly a native of the county, and locally abundant in hedges near Ross, where it fruits freely.

Poterium †*polygamum* Waldst. & Kit. Wynds Point, Malvern, *Crossfield*.

Rosa. On the *mollis-tomentosa* section of this genus, see a paper by the writer in Journ. Bot. 1907, 200. In view of this paper it is thought advisable to give particulars with regard to each member of this group.

R. mollis Sm. Rare in the county, and only known in the hilly western and northern parts. Wormesley in the centre; Mary Knowl and Richard's Castle in the north; Black Mountain in the west.

R. submollis Ley. Much more common than the last, and known in some fourteen stations scattered over the whole of the county.

R. omissa Deség. var. *resinosoides* Crépin. Rare, only known in two districts. Coldborough Park Wood, 1888; Linton Ridge, 1900. The Herefordshire plant is a handsome form with elongate, nearly parallel-sided fruit. Cowleigh Park, Malvern, *Towndrow*!

R. pseudo-mollis Ley. Rather common throughout the whole county. The Cowleigh Park station near Malvern, from which the plant was described by Mr. Baker, was in Herefordshire at the date of the publication of the *Flora of Herefordshire* (1889), but has been placed in Worcestershire by the readjustment of county boundaries which followed the Local Government Act of 1893.

R. Sherardi Davies. Rare in Herefordshire. Gorsley in the south-east; Orcop in the south-west; Burghill in the centre; Aymestry in the north of the county.

R. uncinata Ley. Not common, but widely spread in the east, central, and northern districts. No station is known in the south or extreme west of the county.

R. scabriuscula Sm. Common, and distributed throughout the whole county.

R. sylvestris Woods. Much the same in its distribution as *R. scabriuscula*, but far less abundant.

R. tomentosa Sm. The most common member of the group throughout the county.

R. farinosa Rau. Rare and local. Aymestry, Kimbolton, Dinmore and Westhope, and one or two other localities. The plants here placed under the name of *R. farinosa* Rau are none of them typical, differing from Rau's plant in not having the peduncle quite naked.

Pyrus communis L. var. *Pyraster* (L.). Further investigation makes it probable that this pear is really native in the woods of the Great Doward Hill. — *P. *cordata* Desv. Native at several stations in the south and centre of the county. Great Doward; Penyard Park Wood, Ross; Haugh Wood, Mordiford, *Dr. Wood*. This interesting plant cannot be supposed to be anything but a native plant in the county. The writer has watched it for four or five years on the Great Doward, but has never detected fructification, yet seedlings occur in the vicinity of the older bushes.

Sedum †reflexum L. *var. *albescens* (Haw.). A great part of the *S. reflexum* growing on old walls, in stone quarries, &c., in Herefordshire appears to be the *S. albescens* of Haworth. There is, however, no indication that this stonecrop has any claim to be accounted native in the county.

Heracleum Sphondylium L. *var. *angustifolium* Huds. Bosbury, Moorhampton, Foxley, Moccas, *Bickham*. Abundant and commonly distributed.

*Galium *erectum* Huds. Rare. Pasture between Cradley and Leigh Sinton, just within the Herefordshire boundary, 1898, *Towndrow*!—*G. Mollugo* L. *var. *Bakeri* Syme. Rare, only known in the southern districts. Grass-field, Tretire, about 1890, *B. M. Watkins*; rough field-border near Sellack, 1905.

Scabiosa Columbaria L. In one new station—on the Ridgeway, Eastnor, *Towndrow*!

Solidago Virgaurea L. *var. *cambrica* (Huds.). On the cliffs of the Black Mountain; Olchon Daren, 1886; Red Daren, 1888.—*Var. *angustifolia* Koch. Lowland Woods; Great Doward, 1904; Whitfield, 1906.

Hieracium. In this genus the Rev. W. R. Linton's *Handbook* is exclusively followed for the order and nomenclature of the forms.

H. Pilosella L. *var. *concinnatum* F. J. Hanb. Growing with the type, but less common. Hope Mansel; Great Doward; Breinton; Eardisley; Honddu and Grwyne Valleys of the Black Mountain.—*Var. *nigrescens* Fr. Usually on wall-tops, rare. Wall-top, Brampton Bryan, 1902; the typical plant of Fries. Hope Mansel and Great Doward; with dark shaggy heads, but the hair less black than in Fries's plant. The Great Doward plant is recorded by Mr. Linton as *H. Peleterianum* Mér.

H. lasiophyllum Koch (*H. cinerascens* Jord. Fl. Heref. 193). Still found at the Great Doward Hill at the stations for which it was recorded in the *Flora*, but unknown elsewhere.—Var. *plani-*

folium F. J. Hanb. (*H. pallidum* Fr. Fl. Heref.). Great Doward, at several stations; unknown elsewhere. Both the above, with *H. stenolepis* and *H. pachyphyllum*, are found also on the West Gloucester side of the River Wye at Symonds Yat.—*Var. *euryodon* F. J. Hanb. With the type at the Great Doward: occasional.

*H. *rubicundum* F. J. H. On the Red Daren, Hatterel Hills, first in 1886. Abundant at several stations in the Breconshire portion of the Black Mountain.

H. pachyphyllum Purchas (*H. cæsium* Fr. Fl. Heref.). Locally abundant on the Great Doward, but confined to this hill.

*H. *stenolepis* Lindeb. On limestone rocks, very rare. Great Doward, along with the four preceding forms, but much less common. Usually distinguished from the preceding, not only by technical characters, but by the *flatness* of the head when in blossom. First distinguished in 1897.

*H. *pellucidum* Læst. Native in woods, on railway-banks and rocks; more common in the western than in the eastern districts. Great Doward, abundantly; Sellack; Lyonshall Park Wood; abundant on the cliffs of the Black Mountain.—*Var. *lucidulum* Ley. On mountain rocks; not found in the low country. On the Ffwddog range of the Black Mountain, abundantly; first in 1898.

H. serratifrons Almq. *var. *lepistoides* K. Johanns. Native in woods, on railway-banks and rocks; not rare. Great Doward; Woolhope; Backbury Hill; Upper Sapey; Lyonshall Park Wood, with *H. pellucidum*.

*H. *subulatidens* Dahl. On mountain rocks, locally abundant in the Black Mountain. Taren-'r-Esgob, on the Ffwddog range, 1898, and subsequent years. This plant, and its variety *cuneifrons* Ley, are much more abundant in the Breconshire portion of the Black Mountain than in that falling within the area of the Herefordshire Flora.

*H. *platyphyllum* Ley. On mountain rocks, only in the Black Mountain district. Red Daren, Hatterel range, first about 1897; Taren-'r-Esgob, Ffwddog range.

*H. *euprepes* F. J. Hanb. On mountain rocks with the two last; locally abundant in the Black Mountain. Near the Hay Bluff, Hatterels (but within Herefordshire), 1896; Taren-'r-Esgob, Ffwddog range, 1898, plentifully.

H. pinnatifidum Lönnr. *var. *vivarium* Lönnr. Rare. Walford in the south; Lyonshall Park Wood in the north. First observed in 1898.—*Subsp. *scanicum* Dahl. Rare. Great Doward in the south; Bredwardine in the north; and Taren-'r-Esgob in the west. First in 1898.

*H. *sciaphilum* Uechtr. Common? Until very lately confused with *H. cacuminatum* Dahl.—*Var. *amplifolium* Ley. In woods, also on mountains; widely distributed. Great Doward, Penyard Park, and Caplar in the south; Westhide Wood in the east; Hatterel Hills in the west.—*Var. *strumosum* Ley. Woods; rare. In woods at the lower end of the Grwyne Valley in the three counties of Hereford, Monmouth, and Brecon, 1903.

*H. *cacuminatum* Dahl. Common in woods and on hedge-

banks. Distribution not yet ascertained, but known to be widely distributed in the county.—*Var. *barbareæfolium* (Lönnr.). Less common than type. Sellack; Pembridge; probably in many other localities.

H. septentrionale Arv.-Touv. (*H. corymbosum* Fr. Fl. Heref.). Banks and field-borders; rare. Llangarren in the south; Hardwicke in the north-west. First found in 1886.

H. stictophyllum Dahl. var. *serpentinum* F. J. Hanb. (Fl. Heref. 526, as "*H. gothicum* Fr."; Journ. Bot. 1894, 208, as "*H. sparsifolium* Lindeb.)." The name should be as above. Hatterel Hills, 1886; Taren-'r-Esgob, 1900, on the Breconshire border.

H. tridentatum Fr. Exclude all the stations mentioned in the *Flora*, p. 195. Rare in Herefordshire. Gorsley Quarries, 1893; fine and typical.

H. rigidum Hartm. *var. *Friesii* Dahl., *forma*. Road-banks, wood-borders, &c.; very widely distributed in Herefordshire in the south, west, and north of the county; not known in the eastern districts. The stations mentioned in the *Flora* under *H. tridentatum* must be transferred to this plant.—*Var. *scabrescens* Dahl. Very rare. Roadside in Brilley parish, 1900; cultivated since that date.

H. boreale Fr. The form far most common in Herefordshire seems to fall under that called *Eu-sabaudum*, of Zahn, characterized by having its stem very hairy from base to heads, including the phyllaries themselves. A plant answering to *H. obliquum* of Jordan in being less hairy in all its parts, and having smaller lanceolate leaves, occurs on the Red Daren, Hatterel Hills. Another form, which appears to be the var. *eminens* of Jordan, with glabrescent stems and heads, the leaves ovate, broader, and coarsely toothed, occurs in several places in woods. Bolston Wood, 1888; Haugh Wood, 1891. This form is common in Wales.

*Hypochæris *glabra* L. Native? very rare. Chance's Pitch, Colwall, 1902, *Towndrow*!

†**Asperugo procumbens* L. Alien. Ledbury, in considerable quantity, 1903, *Bickham*!

Limosella aquatica L. Pool margin, Sellack, 1904, 1905, *W. R. Linton, A. Ley*. Very rare in the county.

Mentha longifolia Huds. var. *Nicholsoniana* (Strail), *Flora*, 527. This is the prevalent form of *M. longifolia* throughout Herefordshire. A hybrid—*Nicholsoniana* × *viridis*—occurred on the river-bank at Hereford in 1899.—*M. hirsuta* Huds. *var. *subglabra* (Baker). On the Wye, Great Doward; on the Lugg, Mordiford. Probably common.—*M. *gracilis* Sm. Riverside thicket at the Great Doward, 1906; clearly native.

Origanum vulgare L. var. *megastachyum* (Link). Great Doward, abundantly; Aymestry, with the type. More abundant than the type throughout Herefordshire.

*Calamintha *arvensis* Lam. Very rare in the county. In the grounds at Winds Point, Malvern, *Crossfield*.

*Salvia *pratensis* L. Very rare; native? Bank on Backbury Hill, 1904, *Bickham*.

Aristolochia Clematitis L. Still (1906) in existence in the station at Ross at which it was first observed in 1892.

Mercurialis annua L. Leominster, on recently moved soil, 1906, *Winterbourne.*

Urtica dioica L. *var. *microphylla* Hausm. ? Not rare in Herefordshire. Weston-under-Penyard, Sellack, Carey, Breinton, and other stations. See, on this plant, notes in the *Report of the Botanical Exchange Club*, 1905, 184. A verticillate variety of *U. dioica* bearing all its leaves in threes is common, but always as single stems growing among typical plants.

Habenaria albida R. Br. Very rare, only in the Black Mountain district. Head of the Cusop Dingle, 1899 ; also a single specimen of the hybrid *albida* × *conopsea*, *Dr. Wood* ! Grwyne Valley ; again in 1904.

Narcissus Pseudo-narcissus L. Meadows at Eardisley in large quantities ; also a robust form bearing a crown with recurved lobes and perianth nearly or quite concolorous with the crown, *Rev. C. H. Binstead* ! This form is not the var. b. *lobularis* Haw., the "Tenby Daffodil."

Gagea fascicularis Salisb. One new station. Colwall, 1899, *Mr. W. H. Jones, Towndrow.*

Phleum pratense L. *var. *nodosum* (L.). Ledbury, 1902, *Bickham.*

Kœleria cristata Pers. Rare. Marcle Ridge Hill, in two spots in fair abundance, 1899.

Athyrium Filix-fœmina Roth. *var. *Watsoni* Syme. In woods in the Grwyne Valley, about the year 1875. The Grwyne specimen answers well to Watson's type-specimens. The writer has searched in vain in the Grwyne Valley for the plant in recent years.

Musci.

*Ditrichum *tenuifolium* Lindb. Very rare. On dried mud of a large pool in Moccas Park ; once found.—*D. flexicaule* Hampe var. *densum* Braithw. Exposed limestone on the summit of Cherry Hill, Fownhope.

Seligeria Doniana C. M. Still only known from the Ross district. Shady rock, Caradoc, Sellack, 1906. — *S. acutifolia* Lindb. var. *longiseta* Lindb. Rare ; only at one station. With *S. pusilla* B. & S. at the Great Doward, 1898.

Dicranum fuscescens Turn. *var. *falcifolium* Braithw. On conglomerate rocks, Penyard Hill, Ross, 1898, *Miss E. Armitage* !

Grimmia orbicularis Bruch. One new station. Nash Scaur, Knill, abundantly, *Binstead* ! — *G. subsquarrosa* Wils. One new station. Crib-'r-garth, Hatterel Hills, 1893.

Rhacomitrium heterostichum Brid. *var. *gracilescens* B. & S. Huntsham Hill, 1906, *Binstead & Armitage* !

Hedwigia ciliata Ehrh. var. *viridis* Schimp. Roofs at Nash, near Knill, *Binstead.*

Acaulon muticum C. M. Very rare. Open fallow near Pentwyn Farm, Brilley, 1905, *Binstead & Ley.*

Phascum Flœrkianum W. & M. One new station. Shucknell Hill, 1903.—*P. curvicolle* Ehrh. Little Doward Hill, *Binstead.*

Pottia recta Mitt. Little Doward and Shucknell Hills; Fownhope, *Binstead.*

Tortula lamellata Lindb. Fownhope; Breinton, *Binstead.*—*T. rigida* Schrad. One new station. Fownhope, *Binstead.*—*T. *cuneifolia* Roth. Rare. Breinton; Brobury Scaur; Eardisley, *Binstead.* —*T. Vahliana* Wils. Breinton Common during several seasons; Bishopston, *Binstead.* — *T. angustata* Wils. Rather rare, usually found on hedge-banks. King's Capel, 1903; Breinton, *Binstead*! Kimbolton, *Rev. W. E. Thompson*! Whitney-on-Wye, 1906, plentifully; Rowlstone, 1906, *Binstead*! Exclude the stations given in Journ. Bot, 1894, 210; these refer to *T. subulata* Hedw., form.

Barbula recurvifolia Schimp. One new station. Nash Scaur, near Presteign, *Binstead*! — *B. *gracilis* Schwaegr. Walls and stones, especially limestone; rare. Nash Scaur, near Presteign, 1897, 1905, *Binstead*! wall in Hereford, 1905; stone at Almeley, *Binstead.*

Leptodontium flexifolium Hampe. Rare; one new station. On conglomerate rock, Penyard Hill, Ross, 1898, *Miss E. Armitage*!

*Weissia *crispata* C. M. Rare; confined to limestone districts. Great Doward, 1903, *Dixon*; Nash Scaur, Presteign, *Binstead*!—*W. mucronata* B. & S. Rare; one new station. Aconbury Camp Wood, *Binstead.*

**Pleurochæte squarrosa* Lindb. On limestone, rare. Great Doward Hill, 1902.

Ulota crispa Brid. Rare, and in minute quantity. On wych elm, Pengethly, Ross, 1899; Aymestry, 1905, *Binstead*! — *U. phyllantha* Brid. Rare. Shady damp tree-boles, Great Doward, 1899, 1900.

Orthotrichum affine Schrad. *var. *fastigiatum* Hüb. Rare? Near Bollingham Chapel, Eardisley, *Binstead.* Willow-boles by the river, Great Doward, 1906.

Aulacomnium androgynum Schwg. Rare in the county. Hedge-bank, Dadnor, near Ross, *Miss E. Armitage*!

*Philonotis *capillaris* Lindb. Banks, rare. Nash and Corton Wood, near Presteign; Whitcliffe, Ludlow, *Binstead*!

Webera Tozeri Schimp. One new station. On the Wye at Clock Mill, Bredwardine, *Binstead.*

Bryum pendulum Schimp. On ant-hills, Eardisley, *Binstead*; wall-top, Great Doward, 1905. — *B. *uliginosum* B. & S. Very rare. Wet willow-holt, Pontrilas, 1893, 1906. — *B. intermedium* Brid. Rare. Riverside, Bredwardine, *Binstead*; Great Doward, 1900.—*B. cæspiticium* L. var. *imbricatum* B. & S. One new station. Corton Wood, Presteign, 1905, *Binstead*! — *B. capillare* L. *var. *macrocarpum* Hübn. Stream-side at Walterstone, 1906. Not rare. —*B. *rubens* Mitt. On the ground in woods; rare. Warm Hill Wood, Walford, 1861, *teste Dixon, Herb. Purchas*! Caradoc, Sellack; Winforton, *Binstead*; Corton, Presteign, *Binstead*! — *B. *alpinum* Huds. Very rare. On sand by the Wye, at Clock Mill, Winforton, *Binstead.*—*B. *Mildeanum* Jur. Very rare. On the Grwyne, both in Herefordshire and Breconshire, *Binstead & Dixon*, 1903.

*Mnium *riparium* Mitt. On boles and stone by the Wye, rare;

on stone at two spots on the Great Doward; Winforton, on willow-boles, *Binstead*. — *M.* **subglobosum* B. & S. Moorlands, not rare. On both the Hatterel and Ffwddog ranges of the Black Mountain, *Binstead, Ley*.

Fontinalis **seriata* Lindb. In the Wye, rare; Breinton, 1874; Clock Mill, Winforton, *Binstead*.

Heterocladium heteropterum B. & S. *var. *fallax* Milde. Rare. Penyard, Ross, 1899, *Armitage, Binstead*; Great Doward, *Dixon*! Brilley, "abundantly," *Binstead*.

Thuidium recognitum Lindb. On limestone soil, rare. Hope Mansel, 1895, *Binstead, Ley*; Woolhope, *Miss E. Armitage*!

Pylaisia polyantha B. & S. Shady stumps and rotten wood, rather rare. Rotten willow, Much Fawley, near Ross; Woolhope, *Miss E. Armitage*; Bucknall's Wood, Madley, *c. fr.*, 1905; Sarnesfield and near Longtown, *Binstead*.

Brachythecium glareosum B. & S. Great Doward, *c. fr.*, *Miss E. Armitage*; Dormington Quarries, *c. fr.* — *B. albicans* B. & S. Three fresh stations. Penyard Hill, Ross, *Miss E. Armitage*! Fownhope; Winforton, *Binstead*. — *B. salebrosum* B. & S. *var. *palustre* Schimp. Damp meadows, damp clayey wood walks; rare? Damp meadows at Eardisley, *c. fr.*, *Binstead*; near Leominster, *Rev. W. E. Thompson*! wood walk, Dinmore, *Binstead*! Breinton, "in uncertain forms in which the seta varies from smooth to rough," *Binstead*. Typical *B. salebrosum* remains yet undetected in Herefordshire.—*B. velutinum* B. & S. *var. *condensatum* B. & S. Great Doward, 1902, *Dixon*.—*B. plumosum* B. & S. Scattered in small quantities over the lowland parts; nowhere common except in the Black Mountain. Welsh Newton, *Miss E. Armitage*! near Winforton, *Binstead*; Walterstone, 1906, *Binstead*!

Eurhynchium speciosum Schimp. Rare; two new stations. Stones in water, Great Doward, 1906; damp wood walk, Caradoc, Sellack, 1906. — *E. prælongum* B. & S. *var. *Stokesii* L. C. ed. iii. Shady wood, Caradoc, Sellack, 1900. — *E. Swartzii* Hobk. Shady wood, Caradoc, Sellack, *c. fr.*, 1906.

Plagiothecium depressum Dixon. Not confined to limestone. Shady wood, Eaton Bishop, 1905, *Binstead*! Almeley Dingle; Eardisley Dingle, *c. fr.*, *Binstead*. — *P. Borrerianum* Spr. *var. *collinum* Wils. Rare. Warm Hill, Walford, 1900.

Amblystegium **Juratzkæ* Schimp. Common? Breinton; Mansel Lacy, *c. fr.*; Pontrilas, abundantly, *c. fr.*, *Binstead*! This species is as yet imperfectly understood, and its distribution has not been well worked out. The specimens obtained at Mansel Lacy were pronounced by Mr. Dixon to be "good and characteristic."— *A.* **Sprucei* B. & S. Very rare. Exposed limestone at the Great Doward, *c. fr.*, 1899, *teste Dixon, Binstead*! This rare species is usually found on mountains, and has been detected in the Breconshire portion of the Grwyne Valley by Mr. Binstead.

Hypnum riparium L. *var. *longifolium* Schimp. On stones in a pool at Sellack, 1906. — *H. molluscum* Hedw. *var. *condensatum* Schimp. On shady millstone grit at Howle Hill, Ross, 1906.— *H.* **giganteum* Schimp. On moorlands; very rare in Hereford-

shire. Moorland at the head of the Olchon Dingle, Hatterel Hills.

Hylocomium brevirostre B. & S. Very rare; one new station. Woods near Brilley, 1893, *Binstead*!—*H. squarrosum* B. & S. *var. *calvescens* Hobk. Very rare. Shady stones in woods near Brilley, *Binstead*.

Since the completion of this paper the following moss has been detected in the county:—

Brachythecium salebrosum B. & S. Very rare. On rotting wood at Whitbourne, *Binstead & Ley*. This rare moss is unrecorded for any of the neighbouring counties.

Insert also the following:—

Hieracium serratifrons Almq. *var. *Cinderella* Ley. Widely spread in the county. The ligules in this plant are very narrow, and stand apart from each other much more than in other species, giving the fully expanded heads a star-like appearance.

ALABASTRA DIVERSA.—Part XV.

By Spencer le M. Moore, B.Sc., F.L.S.

(Continued from p. 268.)

3. New and Rare Uganda Plants (*continued*).

Compositæ.

Notonia opima, sp. nov. Erecta, fere orgyalis, glabra, caule valido crasso in longitudinem striato, foliis inferioribus (radicalibus?) magnis late obovatis obtusissimis basin versus sensim angustalis ut superiora insigniter minora anguste oblongo-obovata acuta sursum gradatim imminuta et tandem in bracteas transeuntia sessilibus necnon crassiusculis, capitulis pro rata magnis multiflosculosis in corymbis paucicephalis folia superiora multo excedentibus digestis, pedunculis propriis ascendentibus quam capitula multoties longioribus, involucri subecalyculati subhemisphærici phyllis 19-20 lanceolatis acutis margine membrana aurantiaca prædítis membranaceis, flosculis vix exsertis, styli ramis appendice lanceolata papillosa onustis, achæniis cylindricis 10-costatis glabris, pappi setis copiosis scabridis albis.

Hab. Semliki Valley, Toro; *Bagshawe*, 1276.

Folia inferiora 20·0–22·0 × 10·0–12·0 cm., in sicco lutescentibrunnescentia; costæ secundi ordinis utrinque circa 7, in sicco parum aspectabiles, leviter arcuatæ; folia superiora 4·0–10·0 × 1·2–4·0 cm. Corymbi circa 20·0 cm. long. Bracteæ ovato-oblongæ, obtusæ, 1·0–3·0 cm. long. Capitula profecto pansa 4·0 cm. diam. Involucri phylla 2·3 cm. long., 0·5 cm. lat. Calyculi phylla dum adsint lanceolata, circa 1·7 cm. long. Flosculi aurantiaci, in sicco equidem sæpe rosei. Corollæ in toto 1·8 cm. long.; lobi linearioblongi, obtusi, 0·4 cm. long. Columna staminea ad dimidium

suum exserta. Styli rami 0·45 cm. long. appendice 0·125 cm. long. haud exempta. Achænia 0·4 cm., pappus 1·0 cm. long.

A very fine plant, differing from *N. abyssinica* A. Rich. chiefly in the foliage leaves and the involucre of 19–20 narrow orange-bordered leaves.

Asclepiadeæ.

Xysmalobium reticulatum N. E. Br. in Kew Bull. 1895, 251.

In grass land near Mbarara, Ankole; 1256.

Leaves remarkably broad in comparison with their length, 2·3–3·3 cm. long and 1·4–2·3 cm. broad; indeed, sometimes they are almost if not quite as broad as long. This is a very variable species as regards foliage.

Schizoglossum cordatum, sp. nov., syn. *S. Petherickianum* Oliv. var. *cordata* S. Moore in Journ. Linn. Soc. xxxvii. 184.

Hab. Foot of Kabuga Hill, Toro; *Bagshawe,* 1225.

The chief differences between this and *S. Petherickianum* are mentioned in the reference as above. The most important of these differences is the pedunculate inflorescence of *S. cordatum,* all the specimens of the other having sessile umbels, characters of sufficient constancy to warrant their use in the careful clavis drawn up by Mr. N. E. Brown (Flor. Trop. Afr. iv. sect. i. 355). In addition to the different dimensions of calyx and corolla-lobes, I find the leaves of the corona somewhat different in the proposed new species, being shorter relatively to the staminal-column, indeed, scarcely overlapping it at all, and with three strongly marked teeth at the top; moreover, the two wing-like keels on the inner face of the coronal lobes reach as far up as the lobes themselves, instead of ending below the top.

Cynanchum fraternum N. E. Br. in Kew Bull. 1895, 256.

South-west of Lake Albert; 1311.

Brachystelma Bagshawei, sp. nov. Planta humilis caule e tubere satis magno abbreviato juxta solum pauciramoso, ramis in sicco compressis bene foliosis crassiusculis puberulis, foliis linearibus rarius anguste lineari-lanceolatis apicem versus sensim attenuatis apice ipso acutis basi in petiolum brevem sat latum attenuatis leviter crassiusculis secus costam centralem pag. inf. eminentem puberulis ceteroquin fere omnimodo glabris, floribus pro rata magnis in umbella sessili pauciflora foliorum summorum axillam tenente dispositis, pedicellis 0, calycis lobis lineari-lanceolatis sursum attenuatis extus piloso-puberulis basi glandulis 2 parvulis onustis, corollæ magnæ tubo lato abbreviato extus glabro in sicco fusco lobis a basi sat lata lanceolatis sursum longe caudato-attenuatis dorso glabris intus villosulis, coronæ phyllis exterioribus e basi gynostegii ortis cupulam 10-lobulatam efformantibus lobulis triangularibus apice barbellatis phyllis interioribus oblongis obtusissimis antherarum dorso incumbentibus idque paullo excedentibus, stylo apice convexiusculo.

Hab. Kitakwenda, Toro; *Bagshawe,* 1223.

Planta $\frac{2}{3}$-spithamea. Tuber ex schedis cl. lectoris circa 8·0 cm. diam. et 2·5 cm. alt. Caulis indivisus incrassatus, adusque 7·5 cm.

long., maxima pro parte sub solo absconditus. Rami 0·2–0·3 cm. diam. Foliorum limbus 4·5–8·0 cm. long., 0·4–0·7 cm. lat., in sicco dilute lutescenti-viridis; petioli circa 0·5 cm. long. vel minus. Calycis lobi 0·5 cm. long., basi 0·12 cm. lat. Corollæ tubus 0·3 cm. long.; ore 0·5 cm. diam.; lobi 6·0 cm. long., basi 0·6 cm. lat. Coronæ phyllorum cupula 0·12 cm. alt.; hujus lobuli circa 0·05 × 0·045 cm.; phylla interiora 0·1 cm. long., antheras ad 0·035 cm. excedentia. Pollinia ovoidea, 0·5 cm. long.

A remarkable plant, with close affinity to *B. Johnstoni* N. E. Br., but easily distinguished by its longer leaves, flowers without pedicels, smaller calyx-lobes, considerably shorter lobes to its less copiously hairy corollas, lobulate (not toothed) outer corona, and the leaves of its inner corona distinctly exceeding the anthers. The fruit of both species is unknown.

"Corolla dusky green in its free portion, dark red within [*i. e.* in the centre], as is corona. The plant has a rather fetid smell. Tuber dried, pounded and taken as medicine for pains in the chest."

Scrophulariaceæ.

Ilysanthes albertina, sp. nov. Annua, parvula, erecta, minutissime puberula, caule simplici vel sæpius ramuloso gracillimo, foliis sessilibus subsessilibusve parvis linearibus nonnunquam rarissime denticulatis aliter integris, pedunculis gracilibus folia sæpissime excedentibus, calyce tubuloso in lobos 5 semidiviso lobis lineari-lanceolatis leviter acuminatis, corollæ albæ tubo calycem paullo excedente labio postico deltoideo-ovato apice breviter bilobulato lobulis linearibus acuminatis labio antico 3-lobo lobis omnibus inter se subæqualibus suborbicularibus, staminodiis basi gibbosis complanatis apice acutis omnino anantheriferis, capsula parvula anguste oblonga sursum attenuata valvis tandem maxime divergentibus, seminibus minutis.

Hab. Near Ngusi River, Lake Albert Edward; *Bagshawe*, 1383.

Planta summum vix 10·0 cm. alt., plerumque humilior. Folia omnia opposita, 0·3–0·6 cm. long., crassiuscula. Pedunculi circa 0·5 cm. long. Calyx modo 0·2 cm. long.; lobi circa 0·1 cm. long., apice fusci. Corollæ tubus 0·3 cm. long.; labium posticum 0·2 cm. long., basi 0·15 cm. lat., hujus lobuli 0·05 cm. long.; labium anticum 0·2 cm. long.; lobus intermedius 0·1 cm. long., 0·09 cm. lat. Antherarum loculi ovoidei 0·05 cm. long. Staminodia 0·08 cm. long. Stylus subinclusus, hujus lamellæ 0·05 cm. diam. Capsula 0·4 cm. long. Semina 0·02 cm. diam., brunnea.

Differs from *I. ugandensis* Skan chiefly in the narrow shortly acuminate lobes of the calyx, the shorter corolla-tube, and the bilobulate upper lip of the corolla; from *I. andongensis* Hiern also in the calyx and upper lip of the corolla. The staminodes and the small narrow capsules with their minute seeds are additional points wherein it can be distinguished from both these species.

Acanthaceæ.

Brillantaisia grandidentata, sp. nov. Planta elata ramis validis tetragonis puberulis, foliis inferioribus maximis latissime

ovatis obtusiusculis basi alte cordatis margine lobulatis vel grosse lobulato-dentatis utrinque costa costulisque fac. inf. minute pubescentibus exemptis minute puberulis petiolo sursum late alato quam lamina multo breviore etsi sat elongato suffultis, foliis superioribus subsessilibus inferioribus multo minoribus margine sat grosse necnon distanter dentatis summis in bracteas transeuntibus, paniculis subthyrsoideis folia superiora sæpissime excedentibus, calycis lobis corollæ tubo brevioribus linearibus (postico lineari-oblongo) obtusiusculis minute pubescentibus, corollæ majusculæ tubo extus glanduloso-pubescente labia extus glanduloso-pubescentia circa semiæquante, staminibus breviter exsertis ima basi leviter dilatatis ibique pubescentibus ceteroquin fere glabris.

Hab. Forest near Fort Portal, Toro; *Bagshawe*, 1270.

Herba fide cl. Bagshawe circa 3-orgyalis ("15–18 ft. high"). Foliorum inf. limbus adusque 34·0 cm. long., medium versus 32·0 cm. lat., supra læte viridis subtus viridi-griseus; costæ secundi ordinis utrinque circa 12, late arcuatæ; lobuli triangulares, apice obtusi, 1·5–2·0 cm. long.; spatia interdentalia ± 2·0 cm. lat.; petioli crassiusculi, circa 12·0–15·0 cm. long., hujus ala sub limbo circa 3·0 cm. lat. Folia superiora circa 10·0–20·0 × 6·0–14·0 cm., summa imminuta. Bracteæ ovatæ ± 0·8 cm. long. Panicula minute pubescens, pilis glandulosis brevibus sparsissime induta, adusque 20·0 cm. long. Calycis lobi inter se inæquales, 0·5–0·8 cm. long., 0·05–0·1 cm. lat., posticus usque ad 0·15 cm. lat. Corollæ purpureæ tubus 1·2 cm. long., 0·5 cm. lat.; labium anticum 2·6 cm. long., 1·3 cm. lat.; hujus lobi oblongo-lanceolati, obtusiusculi, lobus intermedius anguste ovato-oblongus, obtusissimus, lobi omnes 0·4 cm. long.; labium posticum 2·4 cm. long. Filamenta 2·2 cm. long., antheræ 0·7 cm. Staminodia 0·7 cm. long., horum anthera cassa 0·1 cm. long. Stylus circa 3·2 cm. long.

A very fine species, known by the large dentate-lobulate leaves combined with the subthyrsoid panicles, the relatively short calyx-lobes, and the relative sizes of corolla-tube and lobes. The affinity is with *B. salviiflora* Burkill.

Brachystephanus cœruleus, sp. nov. Herba prolixa saltem semiorgyalis caule sat gracili tetragono ad nodos tumido frequenter ramoso ut ramuli minute puberulo, foliis ellipticis apice acuminatis basi in petiolum sat longum attenuatis tenuiter membranaceis supra læte viridibus subtus parum pallidis utrinque ad nervos minute puberulis ceterum glabris, floribus parvulis in spicis tenuibus deorsum interruptis sursum continuis folia æquantibus subæquantibusve pubescentibus digestis, foliis floralibus amplis ovatis acutis extus piloso-pubescentibus, bracteis calycis lobis similibus etsi brevioribus, calycis piloso-pubescentis lobis angustissime lineari-lanceolatis acutis inter se paullulum inæqualibus, corollæ tubo stricte cylindrico calycem paullo excedente limbo tubum æquante labio postico integro antico breviter 3-lobo.

Hab. Mpamba River, Lake Albert Edward; *Bagshaue*, 1378.

Foliorum lamina ± 10·0 cm. long., 3·5–8·5 cm. lat., juvenilia vero minora; costæ secundariæ utrinque circa 8, inferiores approximatæ, superiores distantes, fac. sup. subplanæ, fac. inf. valde

eminentes etsi tenues; petioli adusque 3·5 cm. long., sed sæpe breviores. Spicæ 6·0–10·0 cm. long.; internodia sua inferiora 0·5–1·0 cm. long. Folia floralia 0·6–0·8 cm. long., in sicco griseo-viridia. Bracteæ 0·35 cm. long. Calyx 0·5 cm. long. Corollæ tubus albus, 0·75 cm. long., 0·135 cm. diam.; limbus cœruleus, ejus labia circa 0·75 cm. long. Filamenta vix adusque 1·0 cm. exserta; antheræ oblongæ, 0·2 cm. long. Discus 0·05 cm. alt. Ovarium anguste ovoideum, compressiusculum, glabrum, 0·14 cm. long. Stylus glaber, circa 1·5 cm. long.

A very distinct species, easily recognized by its slender spikes of small blue flowers.

The pollen-grains have some minute echinulations around the pores, otherwise they are quite smooth.

Isoglossa rungioides, sp. nov. Herba ascendens deorsum lignosa caule sursum bene foliato tetragono ad nodos aliquanto tumido secus lineas duas pubescente aliter glabro vel fere glabro, foliis ellipticis vel ovato-lanceolatis apice cuspidato- vel breviter caudato-acuminatis basi in petiolum brevem acuminatis in sicco viridibus tenuiter membranaceis fac. sup. fere glabris fac. inf. in costis pubescentibus, floribus in spicis oblongis sæpissime ramulos breves brevissimosve terminantibus dispositis, bracteis amplis arcte imbricatis flores occludentibus obovatis apice acuminatis margine late scariosis dorso pubescentibus, bracteolis ovato-oblongis acuminatis calycem excedentibus margine scariosis, calycis lobis lineari-lanceolatis (postico paullo latiore) acutis margine ciliatis, corollæ tubo calyce paullulum breviore amplo labiis tubum fere duplo excedentibus labio antico ad $\frac{1}{3}$ lobato labio postico ovato breviter 2-dentato, antherarum loculis inæquialtis, capsula oblongo-ovoidea acuta 1–3-sperma.

Hab. Forest near the Ngusi River, Lake Albert Edward: also near Hoima, Unyoro; *Bagshawe*, 1361 and 1461.

Folia ± 10·0 cm. long., 4·0–7·0 cm. lat.; costæ secundariæ utrinque circa 8, utrobique eminentes; petioli adusque 2·5 cm. long., sed sæpius breviores. Spicæ solemniter 1·5-2·5 cm. long. Bracteæ 0·8-0·9 cm. long., summum 0·7 cm. lat., margine ciliatæ. Bracteolæ 0·6 × 0·225 cm. Flores albi palato rubro-lineato. Calycis lobi 0·4-0·45 cm. long. Corollæ tubus 0·35 cm. long., 0·22 cm., diam., labium anticum 0·6 cm. long., hujus lobi (quorum laterales paullo longiores necnon angustiores) 0·15-0·2 cm. long.; labium posticum 0·55 cm. long. Antherarum loculi lineari-oblongi, 0·1 cm. long. Pollinis grana normalia. Discus 0·05 cm. alt. Ovarium ovoideum, juxta apicem puberulum, 0·175 cm. long. Stylus puberulus, circa 0·6 cm. long. Capsula 0·7 cm. long., 0·35 cm. lat., sursum puberulus.

Nearest *I. substrobilina* C. B. Cl. but quite different with its scarious-edged bracts among other features. The habit and appearance are those of some *Rungias*, hence the trivial name.

Adhatoda Bagshawei, sp. nov. Frutex 1½-metralis ramulis prolixis tetragonis cortice cinereo mox obductis florentibus rarifoliosis, foliis longe petiolatis ellipticis obtusis basi gradatim extenuatis in sicco viridibus membranaceis supra fere glabris

subtus præsertim ad nervos puberulis, spicis ad apicem ramulorum abbreviatorum quam folia multoties breviorum sitis paucifloris pubescentibus, bracteis parvulis lineari-lanceolatis lanceolatisve sursum attenuatis extus puberulis bracteolas lineari-oblongas obtusas leviter excedentibus, floribus pro rata parvulis breviter pedicellatis, calycis minute pubescentis lobis lanceolatis acutis, corollæ tubo calycem longe excedente sursum leviter ampliato extus minute pubescente palato intruso labio antico fere ad ⅔ lobato lobis lateralibus oblongis obtusis lobo intermedio ovato-oblongo obtusissimo labio postico breviter bilobo lobis ovatis obtusis, staminibus exsertis antherarum loculis subæquialtis inferiore in calcar breve obtusum exeunte, ovario ovoideo-oblongo minute pubescente, capsula sat longa inferne columnari superne expansa pubescente abortu 2-sperma.

Hab. Mouth of Mizizi River, Lake Albert; *Bagshawe*, 1332.

Foliorum limbus 13·0–15·0 cm. long., 6·5-7·5 cm. lat.; costæ secundariæ utrinque 5–6, ascendenti-arcuatæ; petioli 3·5-5·0 cm. long. Spicæ florentes 1·5-3·0 cm. long. Bracteæ 0·3 cm. long., bracteolæ 0·2-0·25 cm. Calyx 0·25 cm. long., hujus lobi 0·2 cm. Corollæ tubus 0·7 cm. long., basi 0·25 cm., faucibus 0·5 cm. diam.; labium anticum 0·6 cm. long., hujus lobi laterales 0·4 cm., lobus intermedius 0·32 cm. long.; labium posticum late ovatum 0·75 cm. long., lobi 0·15 cm. long. Antheræ circa 0·15 cm. long. Discus fere 0·1 cm. alt. Ovarium 0·15 cm., stylus 1·15 cm. long., hic basi puberulus. Capsula apice mucronata, 2·0 cm. long. (pars expansa 0·9 cm.). Semina sicca anguste ovoidea, dense scrobiculata, circa 0·25 cm. long.

A remarkable species, the flowers being rather those of an *Adhatoda* as that genus is understood by Bentham and Clarke, only greatly reduced. The pollen is normal. I know nothing likely to be mistaken for this.

Dr. Bagshawe describes the flowers as "dusky yellow-red." He also notes that the flowering branches are mostly leafless, which is the case with two of the three specimens he sends.

(To be continued.)

ON THE DISAPPEARANCE OF CRYPTOGAMIC PLANTS.*

By A. R. Horwood.

A communication by Mr. W. Bell, read before this Section, on the flowering plants indigenous to Charnwood Forest that have apparently become extinct within the last century, includes so lucid and exhaustive a topographical and historical description of this area that it is quite unnecessary to show what changes have taken place in the disforestation or alteration of this interesting region. It is sufficient to remark that in cryptogams, as in phænogams, Charnwood possesses a characteristic flora of its own, certain species being confined to that region and not occurring elsewhere within v.-c. 55.

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* Read before Section K of the British Association, Leicester, August, 1907.

To take the various phyla of the so-called flowerless plants from highest to lowest, one by one, and trace in each group their past and present constituents, would be both interesting and valuable for comparison with other areas. Unfortunately this cannot be done in detail in every case, as each group has not received the same attention at the hands of local botanists, and in fact in the case of the *Myxothallophyta*, the *Schizophyta*, *Schizomycetes*, *Bacillariales*, *Gamophyceæ*, and perhaps it should also be said of the fungi, especially the micro-fungi, much work yet remains to be done. But it may be stated as a general rule—with the reservation that infusorial organisms may be said to be of universal distribution—that in these cases also (and special reference is made to the "Algæ" and "Fungi") the species of plants found on Charnwood Forest differ from those found in the surrounding areas, and the species thus confined to the mountainous region—whether algæ or fungi—are subject to the same changes of climate, caused by disforestation and drainage, or the effects of poisoning by smoke and other artificial agencies, as the lichens, hepatics, and mosses, which, it is well established, have disappeared from these causes.

It is to the latter that this communication is mainly confined, as in regard to these more data are forthcoming, and the author has had more opportunity of personally arriving at and verifying the facts and conclusions here put forward. It should be noted that what has caused an alteration in the constituents of the lichen-flora affects two groups of entirely different affinity—certain groups of algæ and fungi—united symbiotically in the lichen group, though it may perhaps be added that possibly the factor that causes the disappearance of the latter may affect only one and not both of the former groups.

It will be best to deal first with the lichens, which more than any other cryptogams demand the best natural conditions in their struggle for existence, whilst it will be more convenient also to deal with them here, in giving some general reasons for the universal disappearance of cryptogamic plants from Charnwood Forest within recent years. It is well known that lichens require not only a clear and pure atmosphere in which to exist, but also a moist and generally humid climate. The first requirement was admirably met—as was also indeed the other—by the state of Charnwood a century ago, but since the invention of the steam-engine and the subsequent introduction of railways into Leicestershire in 1832 by the construction of the Leicester and Swannington Railway by George Stephenson, both of these features of the district have given place to others. With the increased impetus given to the mining trade in the Leicestershire Coalfields, new collieries soon sprang up, and in a few years, where formerly all was given over to agriculture, there arose the Desford, Bagworth, Ibstock, Heather, Nailstone, Ellistown, and South Leicestershire Collieries. At Coalville the industry was increased enormously, Snibstone and Whitwick possessing several shafts, whilst further west, in the older part of the coalfield, at Pegg's Green, Swannington, the Calcutta Pit, Cole Orton, and to the north at Lount, Heath

End, and Staunton, many more pits were opened. True, many of these are now closed down, but the process of extension still goes on, and with it more and more smoke and steam is poured out from the chimneys of colliery workings and brick and pipe works, thus daily making the atmosphere more highly charged with fine dust and carbon.

To this must be added the smoke and dust, &c., arising from the ever-increasing number of granite and other quarries or paving-stone cement works that are being started, or are already in operation, in the neighbourhood. In this last instance, not only is the atmosphere poisoned, but the rock itself, so essential to saxicolous species of lichens, is being daily diminished in volume and extent, and it is truly discouraging to the cryptogamic botanist to gaze on the huge quarries at Bardon, where half this famous hill is being blasted away by drilling and other operations, and this is also the case further south at Croft and elsewhere.

Thus, as a result of the extension of mining and other industries and the advance of civilization, the systematic botanist has to face the gradual extinction of all lichens, and, sooner or later, that of most hepatics and mosses, in those regions where at one time they flourished best. This fact was first pointed out to me by the Rev. H. P. Reader, M.A., of Holy Cross Priory, Leicester, who has long studied and helped me to study the cryptogamic plants of Central England. And not only in that region, but indeed everywhere,* as a result of the increased consumption of coal and the diffusion of sulphurous gases which injure the leaves of plants, it is becoming daily more patent that the atmosphere of to-day will not nourish the plants that a century ago were from other reasons losing their hold of their respective habitats owing to draining or the extensive felling of woodland areas. This last alteration brings in suitable conditions for other plants that have a wider distribution, but now the increased amount of impurity in the atmosphere causes these plants also to become gradually scarcer and scarcer.

This new feature in the struggle for existence amongst plants has been dealt with purposely at some length, as it does not seem to have been noticed by any other student of cryptogamic plants in England, and as a committee for the consideration of the extinction of local plants exists, it seems a fitting occasion to draw attention here to this new factor of destruction.†

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* A paper was read last April, by Mr. P. Frazer, at the meeting of the American Institute of Mining Engineers on the sources of injury to vegetation in the neighbourhood of manufacturing works.

† Since this paper was read Prof. Tansley has drawn the writer's attention to a paper read at Bradford in 1900, by Mr. Albert Wilson, dealing with the effect of smoke on vegetation generally in the North of England. In the abstract of his paper Mr. Wilson mentions the effect of smoke on mosses and hepatics as compared with that on higher plants :—" Smoke at a maximum in winter, when many mosses are in a vegetative condition. Great diminution in their abundance and luxuriousness in the neighbourhood of large towns. Peculiar exposure of bark-loving species to smoke influence, and the cause. Threatened extinction of *Ulota* and *Orthotricha*." This bears out the foregoing statements as to the

Not only in Leicestershire is this the case. In the Black Country, where in former days a good cryptogamic flora was to be met with, scarcely a lichen is to be found, whilst the hepatics and mosses have suffered to a similar extent from the same cause. Even in the south of England, where factories are few and far between, the same paucity is to be noticed.

Thus it behoves the lichenologist particularly, and the student of other groups of *Cryptogamia*, to hasten to complete the systematic study of the local floras still lingering on in the less populated districts of the British Islands; for in years to come this will be impossible.

Lichens.

The same agency which has caused the disappearance of so many interesting and rare species of lichens in Leicestershire is also responsible for another marked feature in the present lichen-flora. It is found that numbers of specimens of the genera *Lecanora*, *Lecidea*, and *Verrucaria* are imperfectly developed, spores being absent, and the plants are frequently immature or impoverished. It is thus often impossible to make a determination, as distinctive characters are in these cases based largely on the shape, size, and number of the spores; and it is difficult in this case to be sure whether a plant formerly recorded is not referable to some one of these immature states, for though not still existing in a perfect condition, it may be represented by examples of one or other of these indeterminable specimens. This does not obtain, however, largely except in the genera cited, which consist of numerous species.

The earliest record of a Leicestershire lichen is to be found in Ray's *Synopsis*, 1724, where *Alectoria jubata* is mentioned on the authority of Petiver as occurring in Charley Forest. This is quoted by Withering in the 4th edition (1801) of his *Systematic Arrangement of British Plants* from Dillenius (*Hist. Musc.* 1747). Pulteney (1746), Crabbe (1795), Babington in Potter's *Charnwood Forest* (1842), Coleman in White's *Directory* (1863), Brown in Mosley's *Natural History of Tutbury* (1863), Leighton in his *Lichen Flora*, 3rd edition (1879), Crombie (1895), and the author (1904) have elaborated the catalogue of Leicestershire lichens.

After collating the records contained in these lists, and summarizing the results of recent work in the Charnwood Forest region, it appears that none of the following plants, mainly confined to that district, now exist there:—

Collemodium biatorinum, *Sphinctrina tremelloides*, *S. anglica*, *Coniocybe furfuracea*, *Sphærophorus compressus*, *S. fragilis*, *S. coralloides*, *Stereocaulon coralloides*, *S. denudatum*, *Alectoria jubata*, *Platysma sepincola*, *P. ulophyllum*, *Parmelia Mougeotii*, *P. incurva*, *P. olivacea*, *Lobarina scrobiculata*, *Stictina sylvatica*, *Lobaria*

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nature of the effects of increased smoke, and also extends to the North of England the area here indicated as particularly affected by its agency. Prof. Tansley informed the author that in the neighbourhood of Huddersfield this year he noticed that lichens were almost conspicuous by their absence.

pulmonaria, *Ricasolia lætevirens*, *Coccocarpia plumbea*, *Leproloma lanuginosum*, *Thelotrema lepadinum*, *Strigula Babingtonii*.

In addition to these, as to which there is little or no doubt about their being extinct, there are a considerable number of others that have not been met with of recent years, *viz.*:—

Collema flaccidum, *C. glaucescens*, *C. crispum*, *C. granuliferum*, *C. cristatum*, *C. fasciculare*, *Leptogium pulvinatum*, *L. tremelloides*, *Calicium chrysocephalum*, *C. melanophæum* var. *ferrugineum*, *C. trachelinum*, *Trachylia stigonella*, *Bæomyces roseus*, *B. æruginosus*.

Of the genus *Cladonia* several species have not occurred in fruit, but as so much depends in this genus on this character, and many specimens found are unfertile, it may well be that they still linger on. Of the genus *Usnea* only *U. hirta* is now to be found. In the genus *Parmelia* there are several recorded species, e. g., *P. lævigata*, *P. acetabulum*, and *Parmeliopsis ambigua*, which have not been met with recently.

The same remark applies to *Physcia ulothrix*, *Gyrophora polyphylla*, *G. flocculosa*, and many species of *Lecanora*, e. g., *L. laciniosa*, *L. candelaria*, *L. circinata*, *L. parisiensis*, *L. albella*, *L. glaucoma*, *L. sulphurea*, *L. conizea*, *L. expallens*, *L. symmicta*, *L. polytropa*, *L. syringea*, *L. effusa*, *L. squamulosa*.

Of the genus *Pertusaria*, *P. multipuncta*, *P. velata*, *P. melaleuca*, *P. Wulfenii*, also *Urceolaria scruposa*; and of the genus *Lecidea*, *L. flexuosa*, *L. conglomerata*, *L. tenebrosa*, *L. fusco-atra*, *L. confluens*, *L. verruculosa*, *L. Lightfootii*, *L. cyrtella*, *L. lutea*, *L. diluta*, *L. caradocensis*, *L. abietina*, *L. foveolaris*, *L. pachycarpa*, *L. milliaria*, *L. carneola*, *L. endoleuca*, *L. effusa*, *L. parasitica*.

Of the genus *Opegrapha*, *O. lyncea*, and *O. viridis*, *Stigmatidium crassum*, and of the genus *Arthonia*, *A. lurida*, *A. spadicea*, *A. punctiformis*, *A. epipasta*, *A. pruinosa*, *Graphis elegans*, *G. inusta*, *G. sophistica*.

No species of *Endocarpon* has recently been found, and the following species of *Verrucaria* do not now appear to be still survivors of the former lichen-flora, viz.:—*V. epigæa*, *V. immersa*, *V. cinerea*, *V. biformis*, *V. chlorotica*, *V. nitida*, *V. olivacea*, *V. umbrina*, *V. clopima*.

In estimating the number of extinctions it is, of course, possible that in some cases species have been recorded in error, but, apart from that eventuality, it is obvious from the foregoing list, which supplements the list of undoubted extinctions, that the lichen-flora of Leicestershire—and this remark may well apply to all the other midland counties—is fast diminishing.

Hepaticæ.

Of the hepatics of Leicestershire it may be stated that, with additions since the publication of the flora in 1886, some fifty have been recorded or met with. Of these probably two, *Sphærocarpus Michelii* (=*terrestris*) and *Dumortiera hirsuta* require to be expunged as errors.

Of the remainder the following appear to be extinct, *viz.*:—*Blasia pusilla*, *Marsupella emarginata*, *Lophozia incisa*, *Mylia*

anomala, Lepidozia setacea, Frullania tamarisci, Anthoceros punctatus.

There are also a few which have not been met with recently, which may require to be added to the foregoing list, *viz.*:—*Lophozia inflata, L. bicrenata, L. gracilis, Cephaloziella byssacea, Odontoschisma sphagni.*

Musci.

The following mosses do not appear to have survived in Leicestershire since, probably, some time anterior to the publication of the flora in 1886, viz.:—**Campylopus subulatus,* **Dicranoweisia crispula, Grimmia ovata, Rhacomitrium protensum, Schistostega osmundacea, Bartramia ithyphylla,* **Breutelia arcuata,* **Bryum turbinatum,* **B. alpinum, Mnium cuspidatum. M. stellare, Neckera crispa, N. pumila, Pterygophyllum lucens,* **Pterogonium gracile, Antitrichia curtipendula, Brachythecium plumosum, Eurhynchium speciosum, Hylocomium brevirostre, H. loreum.*

The existence of the following species rests on somewhat slender evidence, and they may possibly be regarded as errors, *viz.*:—**Dicranoweisia crispula,* **Grimmia decipiens, Barbula spadicea,* **Orthotrichum stramineum, Mnium serratum,* **Eurhynchium tenellum,* **E. striatulum.*

The following have not been seen of late years:—*Sphagnum cymbifolium,* **S. squarrosum, S. acutifolium* var. *rubellum, S. cuspidatum, Polytrichum nanum, P. urnigerum,* **Archidium alternifolium, Ditrichum flexicaule, Dichodontium pellucidum, Fissidens pusillus, Rhacomitrium fasciculare, R. canescens, Acaulon muticum,* **Leptodontium flexifolium,* **Orthotrichum leiocarpum, O. pulchellum,* **Bryum pendulum.*

NOTES ON BRITISH RUBI (*SUBERECTI*).

By Edward G. Gilbert, M.D.

(See pp. 129, 210, 248.)

I did not expect my kind friend Mr. Rogers to follow me in all my speculations as to the real relations existing between many of the *Rubi*; but I think he is wrong in supposing that there is a fundamental difference between him and me about them. I, too, keep to the lines indicated in his *Handbook*. It is that book which has guided me more than anything else (except perhaps observation of growing plants and their surroundings) to the impressions which have been made upon my mind about those relations. Without his *Handbook* I could have done nothing. He points out repeatedly the intermediate character of one or other of his species or varieties; or its tendency to vary, so that it becomes difficult (or even impossible) to distinguish it from some other. Coupled

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* Where an asterisk is prefixed no specimen of the plant is known to be in existence.

with these remarks, observation in the field strongly suggests to me that the intermediate character may often be explained, and thus we may advance a step further in our knowledge of the genus. The frequent occurrence of forms intermediate between well-marked but closely allied species suggests the idea of hybridity, especially as the supposed hybrids vary more than well-defined species; and that in the direction towards one or other of their supposed parents.

What I notice is this: that in a lane, a wood, or on a common where some species of *Rubus* is predominant, there is to be found a sprinkling of forms clearly bearing the stamp of that one, but with a mingling of the features of it with those of others in its neighbourhood. If this be not due to crossing, the only other explanation of it seems to me to be that they all, through the influence of environment, have a tendency to assume those characters which the most abundant one there has already assumed.

To apply these remarks to the *Suberecti*. Mr. Rogers points out that *R. fissus* "becomes more like *R. suberectus* in damp shady places," such as the latter grows in. I find in damp woods at Lingfield *R. suberectus*. I also find near it a *Rubus* which strikingly combines the characters of *R. suberectus* and *R. cyclophyllus* Lindeb. M. Sudre, of Angers, has sent to the British Museum a specimen of the same *Rubus*, and thinks it is *R. suberectus* × *R. cæsius*. He calls it *R. sulcatiformis*. It *very* much resembles tall *R. fissus*. *R. sulcatus* grows at the margin of a neighbouring wood; but the leaves are much less hairy, and it looks like a luxuriant large-leaved *R. plicatus* with drawn-out internodes. Has not the existence of *R. sulcatiformis* obscured the distinction between *R. fissus* and *R. suberectus*? At all events, that distinction cannot be made out by a painstaking comparison of the specimens in the herbaria at Kew and the British Museum, if they have been all rightly named; because there are so many intermediates. Typical, *i. e.* selected, specimens of course differ widely. *R. sulcatus* Vest. and *R. plicatus* Weihe & Nees, judging in the same way from the specimens in the National Herbaria, cannot be clearly discriminated from *fissus* and *suberectus*—or at least have not been. This can hardly be from any other cause than that the boundary between them is ill-defined in nature or obscured by hybrids.

The only other *Suberecti* or *Subrhammifolii* I have found here which stand out distinctly from all other *Rubi* are *R. nitidus* W. & N. and *R. affinis* W. & N. Others, which I find more sparingly and more variable, I have been led by nature and by Mr. Rogers's *Handbook*, and by the failure of the contributors to the National Herbaria to separate them from their allies and from one another, to suspect strongly are hybrids. They are *R. Rogersii* (*plicatus* × *affinis ?*), *R. opacus* (*nitidus* × *affinis ?*), *R. nitidus* var. *Briggsianus* (*affinis* × *nitidus ?*), *R. integribasis* P. J. M. (*nitidus* × *plicatus* sometimes, sometimes *nitidus* × *Balfourianus ?*). I believe I could give good reasons for my suspicions.

May I say here that I have included under *R. nitidus* *R. hamulosus* L. & M., as Mr. Rogers does. It is much commoner than the true *nitidus* W. & N., and, if I am right in my determination, very distinct.

From the common level of *R. fruticosus* the well-defined species appear to stand up like sharp ridges. In the spaces between these ridges appear (as it were) the low rounded elevations of the intermediates spreading laterally from ridge to ridge.

I feel rather flattered to find that the Rev. E. S. Marshall should have been able to learn any lesson from anything that I could write, especially as I can assure him that I learned that lesson long ago. But can repeated and minute examinations of all the specimens of brambles at the British Museum and at Kew from all parts of the British Isles, not to mention personal visits to the north, south, east, west, and middle of those islands, be strictly called "local" researches? Perhaps so, as the islands are comparatively small. But I have also, when it seemed desirable, referred to Continental specimens, and compared them with my own, especially the valuable series sent by M. Sudre to the National Herbarium.

Mr. Marshall's observation that *R. cæsius* is not found in the Scotch counties where *R. fissus* occurs is very interesting, as tending to show that, if *fissus* should not be a distinct species, it is more probably a variety of *suberectus* than a hybrid. But turning to Mr. Rogers's list of comital numbers I find that he says that *cæsius* is probably present in *every* county of the British Isles. He has noted *R. fissus* from fifty-eight, and from all those but six he has noted *cæsius*; while in twenty-six counties in which he has not noted *fissus* he has not noted *cæsius*. This is suggestive, I think, of something more than an accidental coincidence.

I have specimens from a plant growing near *R. suberectus*, which I took to be probably *suberectus* × *corylifolius*, and have again compared them with the following from which I find them indistinguishable, *viz.* some specimens of *fissus* and some of *suberectus* at Kew, and M. Sudre's × *sulcatiformis*.*

Mr. Marshall's observation that there is no *R. affinis* or *R. nitidus* near *R. Rogersii* in Scotland is noteworthy, as M. Sudre has judged the Rev. W. R. Linton's specimen in the "Type Set" to be a form of *R. affinis* W. & N., and I had before that thought it was probably a hybrid of *affinis* with *plicatus* or *nitidus*. Mr.

* Since writing the above I have been to Lingfield and carefully scrutinized that wonderful patch of suberect *Rubus*. Its stems reach a height of eight feet, and are very erect; but its numerous purple acicular thorns are those of *fissus*, as are its imbricate often hairy leaves. Intimately mixed with it is a great deal of *R. Balfourianus*, and close by some *corylifolius*. But I could not this year find any specimen in which the appearance of crossing seemed so clear as it had done on a previous occasion. Nevertheless, the purple prickles of *corylifolius* bear a striking resemblance to those of *fissus*; and it occasionally has a 7-nate leaf, one of the leading characteristics of *fissus*. It and its close relative *Balfourianus* also flower like *fissus* and *suberectus*, earlier than any other *Rubi*.

Rogers very kindly lent me a specimen of *R. Rogersii*, which proved to be exactly like one or two which I have gathered in Kent and Sussex, and a specimen in the "Type Set" named "*opacus*"; but none of them have the cordate leaves and crowded prickles mentioned in his *Handbook*. It must, I should think, be an indistinct species; because Mr. Rogers himself saw plants in bloom here in 1902, of which he could not say whether they were *Rogersii* or not. *R. Rogersii* is common about Tunbridge Wells, and I have identified it (I believe) with Dr. Focke's *R. ammobius*, which is considered in Nyman's *Conspectus* to be × *plicatus*, of which I had looked upon it as a variety. In the National Herbarium there are at least two specimens, each named by one authority *ammobius*, and by another *Rogersii*. It varies much.

Mr. Marshall may be interested in the fact that *R. Marshalli* is common about Tunbridge Wells. Being of striking features, its variations or hybrids are readily recognized, and are numerous.

The difficulty of recognizing some of these hybrids (or varieties) even by the best observers, unless their memories of the types are refreshed at frequent short intervals, cannot, I think, be better exemplified than by the following facts. There is in the British Museum a specimen named *R. leucostachys* × *imbricatus* by the Rev. W. M. Rogers, Dr. Focke, and Mr. Marshall in combination; a few sheets from it is another of the same plant gathered by the same three gentlemen at the same place and on the same day, but named *R. leucostachys* × *Marshalli*.

I have lately ascertained the existence in Wales of *R. montanus* Wirtg. (named *R. senticosus* Koehl. by M. Sudre). I found it four years ago at Llandrindod Wells. It seems to be the same as *R. nemoralis* var. *Silurum* A. Ley, with which I had identified it on the strength of a specimen from Mr. Rogers in the "Type Set" so labelled. It manifestly deviates more from the *Rhamnifolii* towards the *Suberecti* than do Mr. Rogers's other varieties of *nemoralis*. At Llandrindod Wells it varies considerably, approaching sometimes *rhamnifolius* or *carpinifolius*, at others *nitidus* or *plicatus*. As the width of its own variation is greater than the distance which separates it from *nitidus* on the one hand, and from *carpinifolius* on the other, it seems to me more reasonable to suspect it to be a hybrid than a separate species. This brings it into connection with *R. opacus* and *R. affinis* var. *Briggsianus*, both which are closely related to *R. nitidus* W. & N. Now I find that in the "Type Set" at Kew a specimen of "*R. nem. Silurum*" from the two Linton's is just intermediate between Mr. Rogers's specimen and a specimen of *R. opacus*. What could be more likely, if they are both hybrids of *R. nitidus*, as there are other reasons for suspecting? In Nyman's *Conspectus*, *R. montanus* is made a close ally of *R. carpinifolius*.

SHORT NOTES.

ACERAS ANTHROPOPHORA R. Br. IN NORTH SOMERSET.—In May last I was conducted by Mr. A. E. G. Way through the Clifton "wild-garden," where he cultivates the majority of British flowers and is remarkably successful in his treatment of orchids. Among many other species I saw a fine patch of *Aceras*, numbering some twenty strong plants. These, Mr. Way assured me, had been derived from a few roots found by him about fifteen years ago in a rough pasture on high ground between Portishead and Clevedon, on the ridge that overlooks and runs parallel with the Channel about twelve miles from Bristol. Mr. Way at that time used the land as a game preserve, and fears that his keen-eyed keeper, whom he instructed to take up some of the roots, must have lifted them all, for he failed to find any more of the plant afterwards, although he searched repeatedly in succeeding seasons, until his tenancy of the land ceased. He has never obtained roots of *Aceras* from any other source. The place described is a large enclosure of primitive upland pasture on Weston Lodge Farm, at an elevation of under 300 ft., in the parish of Weston-in-Gordano. The Carboniferous Limestone rock crops out through the turf here and there, and carries a characteristic vegetation of *Helanthemum Chamæcistus*, *Trifolium dubium*, *T. filiforme*, *Spiræa Filipendula*, *Thymus*, &c. Portions of the ground are separated by wire fencing for game-breeding purposes, and these positions are shifted from time to time. The matter is naturally of much interest, seeing that this orchid is essentially an Eastern Counties plant, apparently unknown hitherto farther west than Berkshire. But I notice that Mr. Preston, in his *Flowering Plants of Wilts*, states that it has been reported from three stations in that county, although he had seen no specimens. It is unfortunate that so rare a plant cannot be shown to exist to-day in North Somerset, but it is not improbable that there may be a future reappearance on the ground where Mr. Way found it.—JAMES W. WHITE.

OPHRYS TROLLII Hegenb.—My earliest acquaintance with this variety of the bee-orchis was made through a specimen collected in "Cook's Folly Wood, Clifton, 24 June 1851," by the late J. H. Cundall, and marked "Drone Orchis." In later years I began to hear mention of a "Wasp Orchis" among young people interested in botany. About July, 1885, four specimens were found on the Leigh (Somerset) side of the Avon, and these accorded well with Reichenbach's description of *O. Trollii*, "labello acute triangulo elongato lobis lateralibus plus minusve obsoletis." Moreover, the markings of the lip were paler and more yellow than in the type, and the sepals rather longer and more acuminate. In all the flowers the labellum, viewed in front, presented a long triangular outline four times as long as broad, tapering from the base into an attenuate little-reflexed point. I heard of another specimen on the Gloucester side of the river in 1900, and in July of this year (1907) a patch of about a dozen plants occurred in one spot, and

one in another, all by the Port and Pier Railway, under Clifton Down. The whole of these localities are in the Avon Valley below, and within two miles of, Clifton Suspension Bridge. I have referred to a number of our principal county floras without finding a single mention of this variety; nor is it included in all British descriptive floras. I judge, therefore, that it must be remarkably rare in this country. Certainly it is a beautiful form, well worthy of distinction. Messrs. Hanbury and Marshall (*Fl. Kent*, p. 334) ask if *O. Trollii* be a hybrid, or a true variety of *O. apifera*. The Bristol specimens cannot be hybrids, as *aranifera* and *arachnites* are absent from the counties of Gloucester and Somerset.—James W. White.

Orchis ericetorum Linton.—For some years past it has appeared to me that *Orchis ericetorum*, which I now regard as a distinct species, and *O. maculata* had a different period of flowering. At Bournemouth I noticed that the former was going over when the latter was in full swing; and I have Carnarvonshire specimens gathered at the same date in the same year with a similar difference in the flowering stage. In this part of Dorset, at the junction of the tertiary with the cretaceous formation, both orchids occur in situations favourable for comparison in this respect. This year I was on the look-out for the first flowering of several plants, and came across *O. ericetorum* beginning to flower on the 10th of May. It was not till the 14th of June that *O. maculata* L. opened its flowers in my garden; though I saw a plant soon after that may have begun about the 10th. The interval therefore in this southern county was for this season a calendar month. It is almost necessary to make this comparison with plants growing in the same neighbourhood and in the same season. A herbarium series has plants from different latitudes and altitudes, and of various seasons. Our floras give May to July as the flowering season of *O. maculata*. This is correct for *O. ericetorum*, which in hilly districts or northern counties linger on through all July. But *O. maculata* does not flower in May, I feel assured, and does not usually begin in southern counties till the second week in June, and should rather be described as flowering June–July.—E. F. Linton.

Gall Formation in Ramalina.—In a recently published paper (*Ber. deutsch. Bot. Ges.* xxv. (1907) p. 233) Prof. W. Zopf gives an account of his examination of plants of *Ramalina kullensis* that varied from the normal development in having a short, thick, twisted and deformed thallus, on which spermogonia were richly developed, but, as a rule, no apothecia. The hypertrophied laciniæ were hollow, and had here and there small holes scarcely visible to the naked eye, with fewer, much larger openings that looked as if eaten or torn at the edges. Quantities of microscopic excrementa, round or oval in form and dark in colour, were also to be found on the thallus or in the openings. Remains of three insects occupying the cavities were found: a species of mite (*Acarus*), a spider, and one of the *Diplopoda*, *Polyxenus*. The two latter were

only occasionally present; the mites were always connected with the deformations, and are considered to be the origin of the abnormal growth, though it may be occasionally due to minute spiders. Prof. Zopf also examined specimens of *R. scopulorum* var. *incrassata*, and of *R. cuspidata* var. *crassa* from the west coasts of France. These plants bear a striking resemblance to each other, as well as to the hypertrophied *R. kullensis*, and on examination were found to be inhabited by the same gall-forming mite. The Professor regrets his inability to examine the British specimens, *R. scopulorum* var. *incrassata* from the Channel Islands, South-west England and North-west Ireland, and *R. cuspidata* var. *crassa* from the Channel Islands, North England and North-east Scotland. Since reading the paper I have examined these specimens and I find all the phenomena noted by Prof. Zopf present in the British forms—the thickened thallus, exactly like his representation of the deformed *R. kullensis*, the abundance of spermogonia, the holes of two dimensions in the thallus, the quantities of small round or oval, dark-coloured excrementa, and the remains of mites, though these may not be the original gall-formers. There seems no reason to doubt that these varieties are merely gall-bearing forms of their respective types.—A. Lorrain Smith.

New Localities of Rare Lichens.—On looking over a series of lichens submitted to me by Mr. W. West, of Bradford, and collected by him in the Outer Hebrides and in North-west Ireland, I have found included some specimens entirely new to the districts. One of these, *Pertusaria gyrocheila*, was found on Clesham, a mountain in Harris, 2500 ft. high, the highest in the Outer Hebrides. The species was founded by Nylander, on a specimen collected by I. Carroll near the top of Ben Lawers in 1864. It was collected again by the Rev. J. M. Crombie, at a later date, from the same locality. I am unaware of any other record for this very striking-looking lichen. On the rocks of the west coast of Lewis Mr. West has collected plants of *Ramalina Curnowii* Cromb., distinguished by the black base of the laciniæ and the black spermogonia. It has been recorded hitherto only from southern localities, the Channel Islands, Scilly, and Cornwall. Another southern species, *Roccella fuciformis* DC., he has collected near Westport, on the coast of Co. Mayo. It is battered almost out of recognition, but the microscopic characters of thallus and fruits leave no doubt of its identity. Crombie notes it as rare in the islands of South-west Ireland. It is most commonly found on maritime rocks in the Channel Islands and the south coast of England.—A. Lorrain Smith.

Scutellaria alpina L.—I am not aware that the extreme variability in colour of *Scutellaria alpina* has been put on record. Coste, in his *Flore de la France*, says simply, "fleurs bleues avec lèvre inférieure blanchâtre." Having examined some hundreds of these handsome flowers this summer, I find M. Coste's description somewhat misleading. The colour of the flower is hardly

ever blue, but rather a beautiful violet-purple, resembling that of *Prunella grandiflora* or *Calamintha alpina* as nearly as anything. But it varies from a light mauve, or even lilac, through every shade of purple to a deep violet. In the Mont Cenis district, where the plant is very plentiful from 6000 to 7500 ft. above the sea, one specimen was entirely a rich rose colour, as pink as the flowers of *Pedicularis rosea*, and the bracts were the same colour; but usually the hood is purple and the lower lip a bluish mauve, the central portion only of the lower lip being sometimes nearly white. Last year, in Val Tournanche, on the Italian side of the Matterhorn, I found some plants with the lower lip completely white, but this form is very rare. At Mont Cenis, near the summit of the Col, are three large patches with pure white flowers, all the bracts being of a uniform pale green. In the Maritime Alps, in June, *S. alpina* appeared to be somewhat paler in colour than at Mont Cenis and on the Swiss frontier. Not only does a root send forth flowering spikes of different colours, but often individual flowers on the same head vary considerably in colour, some being much redder than others. In shady situations the leaves are sometimes nearly glabrous, but even in the shade the bracts are generally tinged with purple. Although the increased brilliancy in colour of flowers, and especially the reds, blues and violets, as one ascends mountains is well known, it is a somewhat rare thing to find flowers normally white assume a pinkish tinge in the high mountains. To-day, at Moncenisio, I find *Silene inflata* markedly tinged with pink, and here also *Trifolium repens* assumes a rose colour, so that it is easily confounded with its near allies *T. pallescens* and *T. Thalii*. *Scutellaria alpina* is one of the many alpine plants found in the Pyrenees, the Alps of Central and Southern Europe (particularly on limestone), and again in the Altai region of Northern Asia—H. S. Thompson.

The Box in England.—In Robson's *The British Flora* (York, 1777) I find the following stations given:—"On Box-hill near Dorking in Surrey, at Boxwell in Cotswold in Gloucestershire, and at Boxley in Kent." This is of special interest, as confirming the views expressed in Journ. Bot. 1901, pp. 27–30, 73. He must be very sceptical who doubts its being native on the steep slopes of Box Hill, above Burford Bridge; I have also seen it growing rather plentifully, a mile or more away, towards Betchworth.—Edward S. Marshall.

Rosa hibernica (p. 304).—The following mention of this plant in Templeton's original locality occurs in Mason's *Parochial Survey*, iii. 183 (1819):—"Some time ago a beautiful bed of wild roses which grew to near an acre in extent, beneath the road to Richmond Lodge, was more accurately observed, and it was found that the rose was a non-descript. It is now called the *Rosa hibernica*, and a description of it is given in the Transactions of Dublin Society." The writer was the Rev. W. Holmes, Vicar of Holywood, in which parish the locality is situated. The spot is greatly changed by a road and railway which run through the

"acre" of roses which are now only to be met with in one hedge. —H. W. Lett.

Silene conica in Surrey.—Mr. George Massee recently gave me some plants of *Silene conica*, which were gathered by him on Hockham Common, near Ripley, Surrey. I cannot find any previous record of this species for the county, and it is very rare in the adjoining counties of Kent and Sussex. From the nature of the locality it is evidently indigenous in Surrey.—A. B. Jackson.

NOTICES OF BOOKS.

Popular British Botany.

Flowers of the Field. By the Rev. C. A. Johns, B.A., F.L.S. Revised throughout and edited by Clarence Elliott. With 92 coloured illustrations by E. N. Gwatkin and 345 cuts in the text. 8vo, fancy cloth, pp. xx. 316. Price 7s. 6d. net. Routledge.

Wild Flowers of the British Isles. Illustrated and written by H. Isabel Adams, F.L.S. Revised by James E. Bagnall, A.L.S. With 75 coloured plates. Demy 4to, pp. xv. 168. Price 30s. net. Heinemann.

Manual of British Grasses. By W. J. Gordon. With a coloured illustration of every species and many original diagrams by J. T. Gordon. 8vo, pp. 180. Price 6*s*. net. Simpkin, Marshall & Co. [1907.]

The practice of reprinting early editions of books which have passed out of copyright has been a subject of discussion in the literary papers, especially in connection with the works of Ruskin, which, at one time inaccessible to folk of small means, have now, in their earlier forms, been brought within the reach of the most limited purse. An instance of similar procedure is brought to our notice by the publication by Messrs. Routledge of a new impression of *Flowers of the Field*—a work which first appeared in 1853, and of which a completed and thoroughly revised edition (the twenty-ninth) was issued in 1899 by its original publishers, the Society for Promoting Christian Knowledge, under the competent editorship of Mr. Boulger. A notice of this edition appeared in this Journal for 1900 (p. 195), and although we felt bound to express our opinion that the S.P.C.K., which must have made a large income from the previous editions, might well have paid greater attention to numerous matters of detail, the usefulness of the book from a botanical standpoint was duly recognized.

No such tribute can be paid to the edition now issued by Messrs. Routledge. The name of Mr. Clarence Elliott, who has "edited and revised throughout," is unfamiliar to us, but no further testimony to his qualifications—or rather disqualifications—for the task is needed than that supplied by the volume itself. His preface is a literary curiosity, as will be evident from the

following sentence: "To have made a thoroughly scientific work of it was deemed undesirable, for it would have meant so much pulling to pieces and putting together again, that the charming classic, the simple book in which for so many years keen unscientific amateurs have been wont to burrow, and find quite successfully the names of the plants which they collected, would no longer have remained."

The fact that Mr. Elliott has not even troubled to print the name of his author correctly—he speaks of the book as "John's" whenever he has occasion to refer to the author—is typical of the extraordinary carelessness which ramps through the book. The specific names under the figures almost always have a capital, while in the text, in cases where they ought to have one, it is not employed. There is no reference in the text to the plates, and the names do not correspond. Misprints abound—*e.g.* "Chic*k*ory" (plate 54); "Cryptipedium" (index); "Marsh Plum-thistle" (p. 162); "saxitalis" (p. 43); "Achillia" (p. 176); "ochrolucea" (p. 228). Under the page-heading "Glumaceæ" we have *Araceæ* and other orders which are not glumaceous; the figure of *Draba verna* (p. 23) is upside-down! Many of the figures in the text were wisely discarded as far back as 1871 by the S.P.C.K. as inadequate—the Society would do well, by the way, in future editions, to carry the process further—and the lettering of these is not always accurate—*e.g.* the two Chrysanthemums are included under one name on p. 174.

We have not a copy by us of an early edition, but the claim on the title-page that the volume before us has been "revised throughout" is sufficiently met by the statement in the preface that "most of the additions and alterations are of an unobtrusive nature." The additions do not include such recent accessions to our flora as *Stachys alpina*; we detect, however, Mr. Elliott's hand in the remark on *Ononis*: "Several more or less distinct forms occur which have been variously classed as species or varieties, but they scarcely come within the scope of the present work." The incompleteness which marred all the editions previous to Mr. Boulger's is observed here; *Cyperaceæ* and *Gramineæ* are entirely omitted.

A great feature is made of the coloured plates, which, as Mr. Elliott says, "speak for themselves." The few which are devoted to one plant are sometimes (but not always) quite good; the rest, on which two or three scraps of different plants are thrown down, are for the most part almost ludicrously feeble, although they have a kind of accuracy—sufficient at any rate to enable us to say that neither artist nor editor have always named the plants correctly: *e.g.* on plate 39, where what is called "Premorse Scabious" is *almost* certainly *Scabiosa Columbaria* and "Small Scabious" is *quite* certainly *Jasione montana*! There is ample ground for further criticism—as to its weight, for example, nearly 3 lb.!—but we have already devoted more space to the volume than it deserves. It is however important that the real value of a book of this kind should be plainly stated, because the reviews in the ordinary

newspaper press are usually written without expert knowledge, and thus mislead; the *Westminster Gazette*, for example, from which better things might be expected, thinks the edition "altogether a very desirable one."

The quarto volume entitled *Wild Flowers of the British Isles*, illustrated and written by Mrs. H. Isabel Adams, and revised by Mr. Bagnall, is in every respect a beautiful book. The coloured plates fully justify the statement that they "constitute a triumph for modern methods of colour-printing," and testify both to the artistic skill and botanical knowledge of their author. We have seldom if ever seen the substance, so to speak, and the habit of the plants rendered with such accuracy as in such instances as the Marsh Marigold and the Wallflower, to name only two among many; although here and there the plates are a little too much crowded and the colours somewhat too subdued. Mrs. Adams not only draws well, but her caligraphy is excellent; the characters of the orders were in some cases written on the plates, and the names are always given in the same elegant lettering. No greater contrast could be found than that existing between these careful studies from life and the feeble prettiness—not always even that—of the plates referred to in the preceding notice.

The descriptions are short, but careful and sufficient, as might be expected in a book submitted to Mr. Bagnall's revision; type and paper are excellent, binding elegant and suitable. If it were complete, it would be in every way a desirable possession—indeed, it is so now. But we should not be doing our duty to our readers if we did not point out that the work is incomplete—only the orders down to and including *Compositæ* are included, but nowhere do we find any mention of its limits, nor any indication that another volume is in contemplation.

Mr. Gordon's book on Grasses will not, we think, greatly facilitate the study of the order, partly because of its extraordinary arrangement, which renders it almost impossible to consult. Three "chapters" are devoted respectively to an "index to species, including synonyms," an "index to genera" and an "index to customary names"; to these last two chapters (iii. and xiii.) are devoted, the former referring to the plates—though this is not stated—which themselves are not lettered. But the figures appended to the names in these indexes do not refer to the pages on which the plant is described, but to the number it bears in "Chapter ii. List of British Grasses," which list contains no reference to the body of the work! Thus "Oryzoides, Leersia, 1," "Leersia 1," "Rice Grass, 1," and others merely indicate that the plant is numbered 1 in the list on p. 11! It is only by hunting through the book—for no cross-references are anywhere given—that we find that the genus is described on p. 61, the species on p. 108, each also appearing in the "tabular view" on pp. 140, 143! Anyone, therefore, wishing to use the book must first sit down and make a practicable index.

The "index to species" contains a large and absolutely useless number of names which find no mention anywhere in the book—

thus under 72 to which "Caudatus, Mygalurus" is referred, we find only Festuca Myurus, nor is any indication anywhere given that this is a mere synonym, unknown, we think, in British books. Under "customary names" we have, to take only two consecutive examples, "Asperella" for *Leersia* and "Andes Grass" for *Arrhenatherum*: where, one wonders, can such names be "customary"?—the text does not explain.

When we come to consider the botany of the book, we find that "The Order and its Tribes," "The Tribes and their Genera" and "The Genera and their Species," form three chapters, and that the last is "arranged alphabetically for ease in reference"! The first of these begins: "The grasses have a botanical order to themselves, Gramineæ, which is one of two orders—Cyperaceæ being the other—forming the Glumifloræ, the most important and most widely distributed group—cohort or series, or whatever it may be called—into which the monocotyledonous plants have been divided." This, with a sentence from the preface—"For its food plants no botanical order is of greater interest, nor has any been more written about, some of the books being really wonderful for the labour they involved"—and this on *Avena fatua* (p. 78)—"This plant affords a noteworthy instance of the limitations of popular metaphor. Sowing wild oats is a phrase that does not appeal to the botanist, for wild oats are very beautiful, and from the wild oats by persistent collection and sowing came the edible and profitable species, *A. sativa*, the food of horses and men"—will sufficiently illustrate Mr. Gordon's style. As to his facts, take this on *Cynosurus echinatus*—"This species, which is fairly common on the Sandwich meadows, is most useful to the farmer when it dies to prepare the soil for a better grass" (p. 91)—and compare with the statement as to the plant in the *Flora of Kent*, whence it appears that Hudson's record (1778) has not been confirmed.

A word must be said as to the plates; these, although crudely coloured and not well drawn, form the best part of the book, and may be useful to the beginner who wishes to be spared the trouble of working out his plants.

Die Purpurbakterien. Dr. Hans Molisch. Jena: Gustav Fischer, 1907. Pp. vii. and 92. Four plates. Price 5 marks.

The author of this treatise has conducted a series of researches on a very interesting group of colour bacteria and now publishes his results. The group differs from other bacteria, in that light and indeed strong sunlight is required for their development. They occur on decaying organic substances where there is a lack of oxygen, as for instance on hay, cooked eggs, bones, worms, etc. If any one of these substances is put in a closed jar well covered with water and placed in a well-lighted window, the purple colour, due to the presence of the bacteria, makes its appearance in about a month, more or less. Experiments were made with many different culture media, and an entirely new group of these organisms that does not lay down sulphur was discovered and diagnosed.

A number of new genera and species are named and the different properties of the purple bacteria are examined, and their behaviour in regard to light, to oxygen, and various acids fully described. Molisch also subjected the colouring matter to a series of chemical and physical tests, finding two new colours: one green, which he names *Bakterio-chlorin*, and the other *Bakterio-purpurin*. The former resembles chlorophyll green but gave a different spectrum, it was also more susceptible to light, becoming brown in strong sunlight. The *Bakterio-purpurin* crystallized very easily, and was demonstrated to be one of the Karotin group. The illustrations represent the bacteria, the colour crystals and the spectra formed by the two colouring matters.

A. L. S.

BOOK-NOTES, NEWS, &c.

At the meeting of the Linnean Society on 20th June, Dr. Rendle gave an account of the plants collected on Mt. Ruwenzori by Dr. A. F. R. Wollaston (1906) from the paper by himself and Messrs. E. G. Baker, Spencer Moore, and A. B. Rendle. The plants were collected from two camps—one at about 3500 ft. above sea-level on the south-east slopes of the range between the mountains proper and Lake Ruisamba; the other at 6500 ft. in the Mubuku Valley on the east side of the range. Expeditions were made to intermediate and higher altitudes, the highest camp being at about 12,500 ft., whence plants were collected up to the snow-level at about 14,500 ft. on the east side. The time of year was January to July. Dr. Wollaston gives notes on the vegetation at different altitudes from 3000 ft. to 15,000 ft., and has brought back some photographs showing the nature of the country and different aspects of the vegetation. The plants at the lower elevations include some common tropical weeds, with a fair percentage of more localized species and some novelties. Cultivation ceases above 7000 ft., and at from 7000 ft. to 8000 ft. is found the largest forest of the range; a large *Dombeya* is noticeable, and one of the finest trees is a *Podocarpus*. Above 8000 ft. the forest thins out, and is gradually replaced by a belt of small tree-heaths and *Podocarpus*. The bamboo-zone begins on the east side at about 8500 ft. and continues up to 10,000 ft. The big tree-heaths begin about 9500 ft., at which level a number of terrestrial orchids were found, with numerous ferns. From 10,000 ft. to 11,000 ft. moss is plentiful on the ground and trees forming cushions 2 ft. deep: here were found two tree-Lobelias. In the next thousand feet Helichrysums, Lobelias, tree-heaths, and tree-Senecios are the most conspicuous plants. The heaths cease about 12,500 ft., but the Senecios continue almost to 14,000 ft. Another *Lobelia* appears at about 12,500 ft., and is found on the steepest slopes almost to the snow-line. Helichrysums, sometimes forming bushes four or five feet high, grow luxuriantly. A small *Arabis* was found at 14,000 ft., and a rush, a new species of *Poa*, and mosses, were found growing up to the level of permanent snow.

Under the title *An Introduction to Practical Botany* (price 2s.), Messrs Dent have issued, in their Series of Mathematical and Scientific Text-books for Schools, a useful and suggestive little volume, the work of Mr. E. H. Davies, B.Sc., of the County School, Barry, Glamorgan. It consists of seventy-eight lessons, in each of which some plant, or part of a plant, is put before the young student, who is encouraged, first, to make definite observations, or perform some simple experiment; secondly, to make drawings of the object or experiment; and lastly, to write a clear description of the observations made on the work done and the results obtained. The book should be useful to teachers in elementary and secondary schools.

The first volume of the useful series of articles on the recent progress and present position of some of the many aspects of modern botany, issued under the title *Progressus Rei Botanicæ*, under the able editorship of Dr. Lotsy, of Leiden, has been concluded with the issue of a third part. This last instalment, by R. P. van Calcar, is a *résumé* of the progress made in the study of immunity and the specific action of bacteria, &c., in the last thirty-seven years. The undoubted success of this first volume, from the botanist's point of view, should encourage the editor and the Association Internationale des Botanistes—under whose auspices it is issued—to continue so useful a work.

The vacancy in the Department of Botany, British Museum (Nat. Hist.), caused by the retirement of Mr. V. H. Blackman, has been filled by the appointment of Mr. W. Eric Brooks. Mr. Blackman has been appointed to the professorship of Botany at University College, Leeds. Mr. A. W. Hill, Lecturer in Botany to Cambridge University, has been appointed Assistant Director of the Royal Gardens, Kew.

The Twelfth Annual Report of the Moss Exchange Club (York: Coultas and Volans, 1907), though styled "Report for the year 1907," is clearly that of work done in 1906. Issued as it is for the benefit of members of the Club, it is also of interest to outsiders as an expression of the activity manifested in the study of mosses and hepatics in this country. Special interest will be felt in the announcement that the projected Moss Census Catalogue will be issued in a few weeks. In this Catalogue an attempt is made to plot out the distribution of every species and variety of moss in Britain. Owing to the regretted illness of Prof. Barker, its publication has been delayed. We hope that the editors will provide in the Catalogue a bibliography of the papers and collections upon which the Census is based. The greater part of the present report is occupied with an enumeration of the exchange-specimens divided among the members of the club, and a number of instructive critical notes on the plates are inserted in the list.

We greatly regret to announce the death of Mr. E. A. L. Batters, which took place at his residence at Gerrard's Cross on Aug. 11. We hope to publish a notice of his work in our next issue.

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EDITED BY

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CONTENTS

PAGE

On the Variations of the Evening Primrose (*Œnothera biennis* L.). By G. A. Boulenger, F.R.S. .. 353

Carex and *Epilobium* in the Linnean Herbarium. By Rev. E. S. Marshall, M.A., F.L.S. 363

Some British Species of *Phæophyceæ*. By A. D. Cotton, F.L.S. 368

Notes on *Potamogeton*. By Arthur Bennett 373

Short Notes. — Pollen of Hybrid Violets. — *Ophrys Trollii*. — *Ranunculus divaricatus* Schrank. —New Variety of *Spergula arvensis* L.—Branching in Palms.—*Calamagrostis lanceolata* Roth in Essex. — *Parietaria officinalis* L.—South Lancashire Notes.—*Orchis pyramidalis* in Co. Down. 377

Notice of Book:—

The Trees of Great Britain and Ireland. By Henry John Elwes, F.R.S., and Augustine Henry, M.A. 382

Book-Notes, News, &c. 383

Supplement. — A Flora of Glamorganshire. By H. J. Riddelsdell, M.A. (continued).

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ON THE VARIATIONS OF THE EVENING PRIMROSE (*ŒNOTHERA BIENNIS* L.).

By G. A. Boulenger, F.R.S.

Most naturalists have taken a great interest in the observations of De Vries on the variations of *Œnothera*, as observed by him in Holland, which have been summed up in his classical work *Mutationstheorie*, but few as yet seem to have gone to the trouble of forming an opinion of their own on the degree of distinctness of the various "mutants" which are claimed to represent new "elementary species." The question whether or not new species appear at the present day is one of the greatest importance to the philosophical biologist, and if it can be shown that De Vries is mistaken in his conception of "species," it remains as it stood before.

Many are the localities where the Evening Primrose has established itself in this country, and it would be of very great importance to test at different spots the results arrived at by the celebrated Dutch naturalist, an easy and interesting piece of work for our local botanists.

I have had an opportunity of looking into the matter at two different places, and I have found the results so different from those obtained by De Vries, that I think it desirable to place my observations on record, as an incentive to others to pursue the investigation.

To begin with, I have not been able to confirm the distinction established by De Vries between *Œ. Lamarckiana* and *Œ. biennis*, which I find to be connected by every possible transition, the characters, based on the flower, on which he distinguishes the species being of the order of continuous variation. Further, in observing the behaviour of *Œ. Lamarckiana* in a sandy locality on the French seaside, I do not find a species producing here and there a few mutants, but an assemblage of specimens showing endless variation in every direction. If species were to be established on the basis adopted by De Vries, there would be an end of this aspect of systematic work. I feel fully convinced that the experienced systematists who have preceded De Vries were right in regarding *Œ. biennis* as a highly variable species, the forms of which could hardly be defined as well-marked varieties. When De Vries argues that his new species are as satisfactorily established as those of many authors, he is right only in so far as the species to which he alludes were proposed by uncritical botanists upon herbarium specimens without any knowledge of the variations displayed by these plants if studied in the open on a large material.

It has been thought before that *Œ. Lamarckiana* is only a garden variety of *Œ. biennis*; also that it may be a hybrid, although, as observed by MacDougal, it has not been suggested with what species *Œ. biennis* would have hybridized to produce *Œ.*

Lamarckiana. But we know of the numerous hybrid and mongrel combinations produced in the allied *Epilobium*, wild and cultivated. To MacDougal's further objection that "to consider the mutants as reversions to the original ancestors of *Lamarckiana* is impossible, since the mutant forms exhibit qualities not possessed by any other known members of the genus, including *biennis*," it may be retorted that apparently no one, and certainly not he, has yet been able to ascertain the original American habitat of these two forms, taken in the very restricted De Vriesian sense, which are founded on examples obtained in Europe.* In the present state of uncertainty it is futile to speculate on what constitutes the ancestral form of *Œ. biennis*.

I submit the following observations to the consideration of botanists. The specimens on which they are based are preserved in the Natural History Museum.

I am under obligation to Dr. Rendle for giving me every assistance in the department of which he has charge.

I.—Observations made at South Kensington.

The part of the Natural History Museum where the collections preserved in spirit are stored away, known as the Spirit Building, was erected twenty-five years ago on the waste ground at the back of the Museum, which was previously occupied by the International Exhibition of 1862. It was then a wilderness in which numerous weeds grew, conspicuous among them being the Evening Primrose, which displayed its yellow flowers right under the windows of the study assigned to me when I moved into the new building in the summer of 1883. Since that time, paths and something of a garden have been made around the Building, and most of the wild flowers have gradually disappeared. The Evening Primrose has, however, maintained itself, in small numbers, most of the plants being uprooted every year as weeds. This summer I requested the workmen whose business it is to keep the grounds tidy not to interfere with the Evening Primrose, so that I have been able to observe a good many specimens.

The plant answers well to the type usually called *Œnothera biennis* in this country. It was identified as such for me by a botanical colleague in 1883, and, so far as I can recollect, its general habit and the size of the flowers were the same then as they are now. Specimens with very large flowers, such as we often see in cottage gardens near London, and which are designated *Œ. grandiflora* or *Œ. Lamarckiana*, have never appeared around the Natural History Museum. Specimens from Linnæus's collection in the herbarium of the British Museum, labelled *Œ. biennis*, do not differ very materially from the plants which grow round this institution, and I should never have doubted the correct determination were it not for the appearance of MacDougal's work *Mutants and Hybrids of the Œnotheras* (Washington, 1905).

---

* *Cf.* De Vries, *Species and Varieties*, p. 575 (1906).

In the praiseworthy attempt to settle the question of the original habitats of the various forms of Onagras which have been brought to the front by De Vries's work on mutation, he has given a detailed description of what he regards as "*Œ. biennis* (in the strictest sense)" from plants growing on uncultivated land in the New York Botanical Garden. His description of the plant, stated to be hirsute, with finely pubescent buds and small flowers with petals only 12 to 16 millim. long, and sepals much shorter than the tubular portion of the hypanthium, with the pistil constantly shorter than the stamens, did not agree well with the Evening Primrose I had under observation. I therefore submitted a plant to Prof. De Vries, who kindly informed me that my Evening Primrose is a "*Œ. biennis* L. as it occurs everywhere in Europe; it is probably the type described by Linné. The *Œ. biennis* of Dr. MacDougal is another elementary species, occurring in the United States of America. It is one of the numerous forms of *Œ. biennis* found in the United States, but which has not yet been studied or described." Two flowers from the Botanic Garden of Amsterdam, which Prof. De Vries was so good as to send me for comparison, differ only in being a little larger, the petals measuring 27 millim. against 24, which is the maximum length in the flowers observed by me. It is therefore with the sanction of this great authority that I designate the *Œnothera* growing in the Natural History Museum grounds as the true *Œ. biennis*.

I have found it impossible to distinguish any well-marked varieties among the plants which grow under my eyes. And yet they present a great amount of variation, which I think deserves being placed on record.

In some plants the buds are closely grouped together, in others they stand wide apart, forming or not long spikes above the open flowers; in some the stalks or the midrib of the leaves are pink or crimson, in others there is no trace of such colour. But it is especially in the flowers that the variations are most striking if they be compared with De Vries's account of the "elementary species" with which he has dealt. The length of the petals varies between 10 and 24 millimetres. The pistil may be as long as, longer, or shorter than the stamens, and in some buds just before opening it projects most distinctly. I here transcribe De Vries's own words (i. p. 319) in defining his *Œ. Lamarckiana* from *Œ. biennis*:—

"Dass sie [the new species of the *Lamarckiana* group] näher verwandt sind, als mit *Œ. biennis*, *Œ. muricata*, *Œ. suaveolens* und den sonstigen in systematischen Werken beschriebenen Arten dieser Gruppe, ergiebt sich, ausser aus ihrer Abstammung, eigentlich nur aus den Eigenschaften der Blüthe. Diese sind erstens viel grösser als bei den verwandten Formen, und zweitens haben sie längere Griffel.* Der Griffel erhebt die Narben bereits in den

* Further on, however, one of the mutants of *Œ. Lamarckiana* is described as *Œ. brevistylis* (ii. p. 430), in which the style does not project, or but slightly projects, beyond the tube.

Knospen oberhalb der Spitze der Antheren.* Wenn sich die Blüthe öffnet, breiten sich die vier Narben im Kreuz aus, dabei die Antheren in der Regel nicht berührend. Bei *Œ. biennis* dagegen liegen die Narben in der Knospe mitten zwischen den Antheren und überragen diese zur Blüthezeit nicht. Dieser Umstand ist für die Befruchtung sehr wichtig. Bei *Œ. biennis* findet diese bereits in der Knospe statt, in dem die Antheren sich einen Tag vor der Entfaltung der Krone öffnen."†

The following table shows to what extent De Vries's definition of *Œ. biennis* can be relied upon :—

MEASUREMENTS OF FLOWERS FULLY OPEN OF *Œnothera biennis* Linné (*fide* De Vries).

Two specimens from the Botanic Garden of Amsterdam, received from Prof. De Vries, July, 1907.

	A.	B.	C.	D.
1.	27	14	14	26
2.	27	9	13	26

Thirty-five specimens from outside Spirit Building of Natural History Museum, South Kensington, July–August, 1907.

	A.	B.	C.	D.
1.	24	11	13	24
2.	24	10	12	24
3.	21	10	10	21
4.	20	12	9	22
5.	20	9	10	27
6.	19	13	12	19
7.	19	11	11	21
8.	19	9	11	20
9.	18	10	11	21
10.	18	10	10	23
11.	18	9	11	23
12.	17	12	12	21
13.	17	10	11	22
14.	17	9	9	22
15.	16	10	10	23
16.	15	9	10	22
17.	15	9	10	19
18.	15	9	9	18

* In a *Œ. Lamarckiana* from St. Cast (further on, No. 10) I have noted that, although the pistil is much longer than the stamens, the stigma does not project beyond the petals in the bud on the point of opening. There are, therefore, exceptions in both "species."

† The same criterion for the groupment of the "elementary species" is adopted by MacDougal (*Mutants and Hybrids*, p. 52) :—"The evening-primroses of eastern North America, from which probably all of the forms cultivated in Europe are derived, may be divided into two groups—a group including *Œ. biennis*, *muricata*, and *cruciata*, in which the flowers are comparatively small, and in which self-pollination is possible and frequent. The second group, including species native to a region further south, comprises *Œ. argillacea*, *Œ. grandiflora*, and *Œ. Lamarckiana*, in which the flowers are large and the stamens are much shorter than the pistil, a condition which with some accessory structures favours cross-pollination."

	A.	B.	C.	D.
19.	15	7	8	22
20.	15	6	9	20
21.	15	5	8	20
22.	15	4	9	20
23.	14	11	10	20
24.	14	7	9	24
25.	14	6	9	22
26.	14	6	9	19
27.	14	6	8	18
28.	14	5	9	22
29.	14	3	10	26
30.	13	8	9	20
31.	13	7	9	20
32.	13	5	9	20
33.	13	5	7	20
34.	12	3	7	20
35.	10	3	7	17

A. Length of petal. B. Length of style (projecting from tube). C. Length of filament. D. Length of tube in millimetres.

These examples have been picked from different plants and mostly at random. It cannot be said that the variation is discontinuous.

The great variation in the length of the pistil appears in buds on the point of opening, which either show nothing of the stigma, or show a greater or less part projecting beyond the petals. In one case the stigma projected 4 millim. out of a bud the petals of which measured 15 (diameter of conical part of bud 6, length of tube 20, length of ovary 10).

I have received (Sept. 10th and 11th) from Mr. U. R. Sherren samples of four plants growing wild near London. The first, from Uxbridge, may be referred to the var. *Lamarckiana*, the fully open flower showing the following measurements:—

44 26 19 44

One of the buds, ready to open, shows the stigma projecting beyond the petals; whilst another, in the same condition, has the stigma completely enveloped by the petals.

The second, from Acton, resembles the typical *Œ. biennis* as growing in England, but the pistil is much longer, so that the flower would fall under the definition of the *Lamarckiana* group of De Vries:—

19 16 11 20

The leaves are very smooth, with pale pink midribs.

The third and fourth, from a brickfield between Acton and Willesden (collected by Mr. A. Leydell), I also regard as typical *Œ. biennis*; their flowers gave the following measurements:—

21 11 11 27
22 13 13 27

There is no pink in the leaves.

The typical *Œ. biennis*, as growing wild in and around London, is generally characterized by its long flower-spike with

numerous bud-bearing internodes above the open flowers and large bracts, and its dark green, shiny, moderately broad leaves, thus answering to the definition of De Vries's *Œ. scintillans*. As the stigma is sometimes well above the anthers, I cannot see how *Œ. scintillans* is to be distinguished from such examples of *Œ. biennis*. The "grössere Gestalt" of the flowers (*Mutationstheorie*, ii. p. 477) is no criterion, since in a flower of *Œ. scintillans* sent to me by Prof. De Vries the petals measure only 22 millim., whilst they measure 27 millim. in specimens received from him as *Œ. biennis*. How is a systematist to carry out his work in presence of such contradictions?

The study of the above examples entirely confirms the opinion expressed by Mgr. Léveillé (*Mon. Onothera*, i. pp. 19 and 106):—

"Dès à présent nous ferons une remarque fort importante sur laquelle nous appelons toute l'attention des botanistes, c'est la variabilité de la grandeur de la fleur chez les Onothères. Ce caractère se rencontre à peu près chez toutes les espèces qui présentent une forme à grande fleur et une forme à petites fleurs. On ne saurait considerer la grandeur ou la petitesse des fleurs comme des caractères susceptibles d'être employés dans la classification, de telle sorte que l'on ne saurait y voir qu'un caractère accidental répondant tout au plus à l'idée de variation.

"Chez les *Onothera* la grandeur des fleurs et la présence de poils ne peuvent fournir un caractère sérieux pour établir une espèce, pas même pour une variété stable. Il est impossible de savoir où finit l'*O. fruticosa* et où commence la *pumila*. On trouve chez la *pumila* des styles égalant ou même dépassant les étamines tout aussi bien que des styles plus courts que celles-ci. . . . D'ailleurs, ainsi que nous l'avons déjà dit, chez toutes les espèces d'*Onothera*, on trouve la forme à grandes fleurs et la forme à petites fleurs et souvent des intermédiaires entre les deux. Ce sont là des variations sans importance que nous nous refusons à enregistrer à titre de variétés."

From what I have seen in the *Œ. biennis* growing in South Kensington I can fully endorse what has been said by the distinguished French botanist, and I am further strengthened in this opinion by the observations I have made in Brittany.

II.—Observations in Brittany.

In 1899 I was spending my summer holiday at a small seaside place on the north coast of Brittany, La Garde St. Cast (Côtes-du-Nord). Close to the hotel there were a few plants of a large-flowered *Œnothera*, answering to the form often cultivated in gardens, and usually designated as *Œ. Lamarckiana* or *Œ. biennis grandiflora*. Their origin is unknown to the proprietor of the hotel; they are not escaped from his garden. I have been to that place several times since, and found the plant gradually spreading over the sandhills in the neighbourhood of the hotel.

In 1904 I had with me De Vries's famous book *Mutationstheorie*, and I endeavoured to determine the varieties of this

Œnothera with the aid of the descriptions and figures it contains. But I did not succeed, and felt highly perplexed at the great amount of variation I found among these plants, some of which agreed in the large size of the flowers and the very long pistil with the general definition of *Œ. Lamarckiana*, whilst others came very close to *Œ. biennis*. But so numerous and bewildering were the intermediate forms that I gave up the task in despair. Yet I felt absolutely convinced that all these aberrant specimens were descended from the few plants which grew there in 1899. I came to the conclusion that, having run wild, these Œnotheras were reverting to the type of *Œ. biennis*, and at the same time producing other forms similar to those described in the *Mutationstheorie*. However, I found it difficult to marshal them under the definitions given by De Vries, and I felt serious doubt as to the value of the characters adduced by him in support of his "elementary species," seeing that the flowers at least occasionally varied on the same plant beyond the limits assigned by him to his "species."

Last August I went back to La Garde St. Cast, and found the Œnotheras had further spread. Although the specimens were not so numerous as I should have wished, owing to people having picked many, probably the finest of the inflorescences, I examined a large number of them, and was again struck by the enormous variation they exhibited in size and in the shape of the various organs. I dried a selected series of specimens, which I have deposited in the Natural History Museum. I have examined them again, and feel more convinced than ever of the futility of attempting to define species among them. It would be also quite impossible to divide them into two groups—*Œ. Lamarckiana* and *Œ. biennis*—according to the standard set forth by De Vries, *viz.* the size of the flowers and length of the pistil compared to that of the stamen.

The first thing that strikes one is the variation in the size of the petals and in the length of the pistil. This is shown by the following table, in which I have arranged the various specimens according to the size of the flowers, irrespective of other characters to which I shall allude further on, the arrangement being the same as in dealing with the South Kensington flowers. All the flowers here recorded are from different plants, with the exception of three (marked *) which are from the same inflorescence, their measurements being given to show that considerable variation in the length of the pistil may exist in the same plant :—

	A.	B.	C.	D.
1.	48	26	22	38
2.	46	33	20	40
3.	45	37	18	35
4.	43	32	19	34
5.	43	30	18	40
6.	42	32	20	42
7.	42	25	17	40
8.	41	30	18	42

	A.	B.	C.	D.
9.	40	28	20	40
10.	40	27	20	41
11.	40	25	18	42
12.	39	26	18	38
13.	38	34	19	38
14.	35	20	14	37
15.	33	25	18	36
16.	32	11	15	32
17.	31	31	17	37
18.	31	25	15	38
19.	31	19	16	36
20.	31	16	16	40
21.	30	19	14	29
22.	30	15	15	38
23.	30	0	15	30
24.	28	20	15	36
25.	28	17	15	38
26.	28	6	12	33
27.	26	12	15	45
28.	26	10	10	33
29.*	25	6	12	41
30.	25	5	12	31
31.	25	0	16	28
32.	23	15	12	28
33.*	23	12	12	38
34.	23	9	12	33
35.	23	6	13	31
36.	22	17	11	31
37.	22	8	11	37
38.	22	7	11	29
39.	21	4	10	35
40.	21	4	10	32
41.	20	8	11	31
42.*	20	4	10	32

It will be observed from this table that, as in the *Œ. biennis* tabulated above, the range of variation in the length of the tube and of the stamens is not nearly so great as that in the length of the petals and of the pistil.* De Vries himself has remarked that the flowers of *Œ. muricata*, which are not half so large as in *Œ. biennis*, are borne by a calyx-tube of the same length.

Leaving out two aberrant specimens (Nos. 23 and 31), in which the style does not project beyond the tube (as in the *Œ. brevistylis* of De Vries), we see that the length of the style (outside the tube) varies from 4 to 37 millim., and the length of the filament from 10 to 22 millim. In the large flowers (petals 33 to 48 millim.), the pistil is always much longer than the stamens, as in the *Œ. Lamarckiana* of De Vries,† the variation in the length of the

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* Range of variation as observed at:—

	A.	B.	C.	D.
South Kensington	10–24	3–13	7–13	17–27
St. Cast	20–48	0–37	10–22	28–45

† The following are the measurements of two flowers of the typical

style being 20 to 37 millim., that of the filament 16 to 22 millim. In the smaller flowers (petals 20 to 30 millim.) the pistil is usually either as long as or shorter than the stamens, but there are exceptions (Nos. 21, 24, 25, 32, 36); the range of variation is 4 to 20 millim. for the style, 10 to 15 millim. for the filament. The tube is also generally shorter in proportion in the larger flowers than in the smaller ones, just as in the typical *Œ. biennis*, but there is nothing absolute in this character.*

Taking the flowers alone, there is a complete and continuous passage between *Œ. biennis* and *Œ. Lamarckiana*, and the series before me shows the impossibility of distinguishing the two forms on the relative length of the pistil and stamens, as has been proposed by De Vries.

I may add that I have compared some of the above flowers with the examples of *Œ. biennis* and *Œ. Lamarckiana* received from Prof. De Vries, without being able to detect any difference beyond a greater length of the tube in the latter.

The ripe seed-capsules vary greatly in size, form, and coloration.† In the large-flowered specimens (Nos. 2, 6, and 8) they measure 25 to 32 millim. in length, and 7 or 8 millim. in diameter, and (as in *Œ. rubrinervis* of De Vries) they are handsomely striped with red. In No. 1 the fruit is narrower and shows no red. In No. 35 the ripe capsule measures 31 by 6 millim., and is striped with reddish. The largest capsules (42 by 7 millim.) are found in No. 38, and they are striped with reddish. The shortest capsules (23 by 7 millim.) are found in No. 19; there is no red on them. But here again I have found these different types connected by all possible gradations.

Strongly puckered or crumpled leaves (as in *Œ. oblonga* of De Vries) often occur (Nos. 8, 24, 35), irrespective of the appearance of the flowers. No form can be defined by the presence or absence of crimson or pink in the stalks or the midribs of the leaves, which is independent of its presence or absence in the seed-capsules, and varies irrespective of the size of the flowers. Some plants are remarkable for the long and narrow shape of the

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(E. Lamarckiana from the Botanic Garden of Amsterdam, for which I am indebted to Prof. De Vries:—

A.	B.	C.	D.
34	24	19	35
29	18	16	29

* Something similar obtains in the heterodistyled *Primula elatior*, as my lamented friend L. Errera has shown (Rec. Inst. Bot. Bruxelles, vi. 1905, p. 225) that the expanded part of the corolla is generally a little larger and the tube shorter in the same proportion, in the macrostyled specimens; this excess in the diameter of the corolla is coupled with a slight increase in the intensity of the coloration. As pointed out by Darwin (*Different Forms of Flowers*, p. 49), several heterostyled species when cultivated are apt to become homostyled; but amongst the varieties of Auriculas distributed by florists, the long-styled form is rare, as it is not valued, which seems to show that the fact observed by Errera is not of general application in the genus *Primula*.

† In the South Kensington specimens of *Œ. biennis*, their length varies between 24 and 31 millim., and their greatest diameter between 6 and 7 millim.; they are never striped with red.

leaves (as in *Œ. muricata* L. and *Œ. elliptica* De Vries), and these are most conspicuous for that character, even at a distance (Nos. 26 and 32), but then, if we abide by the pistil standard of De Vries, some would be referred to the *Œ. biennis* group, others to the *Œ. Lamarckiana* group. No. 2, as regards the leaves, connects this variety with *Œ. Lamarckiana*.

I must point out that the plants which bore flowers (Nos. 25 and 27) so different in the length of the pistil, did not differ appreciably from each other.

In short, I have tried hard to refer all these variations to the "elementary species" of De Vries, but without success. Acting on the principles advocated by De Vries, it would be possible to describe a further number of new species, in addition to recognizing *Œ. biennis* and *Œ. Lamarckiana* in the restricted sense, but their definition would be very shaky.

As I feel tolerably certain that no Œnotheras have been introduced in the locality since the few large-flowered plants were seen by me in 1899, I have come to the conclusion that, at St. Cast, the curious forms which have appeared, as the plant has spread, are all descendants of *Œ. Lamarckiana*, which, when left to itself, may in certain localities, besides producing other variations, to be further multiplied by crossing, revert to a form so closely similar to the true *Œ. biennis*, from which it is probably derived, as not to be distinguishable from it.

If some of the mutants can be shown to be merely reversions to an ancestral type, how can the others be looked upon as species? They also may be reversions to some type out of which a form of obscure origin like *Œ. Lamarckiana* was first evolved, possibly by repeated crosses between varieties of the polymorphic *Œ. biennis*, which would be quite in accordance with the results of Louis de Vilmorin and Naudin.

Since my return from Brittany I have read Mr. Charles Bailey's paper on "The Evening Primrose on the Sandhills of St. Anne's-on-the-Sea, North Lancashire" (Manchester, 1907), from which I see he also has experienced difficulties in reconciling his plants with the definitions given by De Vries. He found variations in the petals and pistil, as well as in the leaves, some plants having the midribs of a pinkish red or light crimson colour, but this character of *Œ. rubrinervis* was not associated with the brittleness assigned to that species, or with red streaks on the capsule. He also mentions plants, by no means rare, with lighter yellow flowers than *Lamarckiana*, and only half their size. In one of these forms with small flowers the stigma was longer than usual, and its four divisions lay at the base of the corolla, the style being nearly suppressed, the anthers showing fully half an inch above the pistil; this form Mr. Bailey takes to represent De Vries's *brevistylis*. In the other small-flowered form the stigma and anthers were of equal height. This latter form, I should say, represents the typical *Œ. biennis*, to which *Œ. Lamarckiana* may revert. It seems, however, to judge from Mr. Bailey's remarks, that the Evening Primrose does not exhibit on the sandhills of St. Anne's

anything approaching the amount of variation it does at St. Cast.

St. Cast is a charming resort, easily reached from St. Malo, and if some botanist should feel inclined to combine a seaside holiday with the study of the Evening Primrose, I may perhaps hope to see these observations extended by one more competent than myself.

To sum up, I would suggest the possibility of the *Mutations-theorie* being based on false premisses. De Vries has assumed, without any justification, that *Œnothera Lamarckiana* is a natural species. The fact that it was originally described from a garden flower, grown in the Paris Jardin des Plantes, and that, in spite of diligent search, it has not been discovered wild anywhere in America, favours the probability that it was produced by crossing various forms of the polymorphic *Œ. biennis*, which had previously been introduced in Europe. If it be so, and the *onus probandi* of the contrary rests with the mutationists, we have no evidence of mutations in the phenomenon observed by De Vries, but simply one of those cases of Mendelian disjunction of hybrids to which he was the first to call the attention of the naturalists of the present generation. The characters of several parent forms, which may, for all we know, have originated through fluctuating variation, have remained latent in some individuals of *Œ. Lamarckiana* and reappear in different combinations, thus producing the appearance of distinct "species," each definable by several characters, springing up under our eyes.

CAREX AND *EPILOBIUM* IN THE LINNEAN HERBARIUM.

By Rev. E. S. Marshall, M.A., F.L.S.

In the course of carefully reading through my copy of Hudson's *Flora Anglica*, ed. 2 (1778), which is mainly based on Linné's *Species Plantarum*, ed. 2, I was led to suspect that some of the names commonly applied to our British plants could not stand. Having recently been able to spend some time in examining the original specimens of these two genera, and making extracts from *Species Plantarum*, ed. 1, I now venture to submit certain resulting conclusions or suggestions; and it seems likely that a systematic collation of the Linnean Herbarium as a whole with the two editions of *Spec. Plant.* and of *Fl. Anglica* would yield valuable results.

Although it is true that in many instances the specimens of Linn. Herb. do not represent Linné's description, I believe that their evidential value has been unduly depreciated; and it is clear that he used his collection, comparatively small and imperfect though it was, as a foundation for the descriptions, as the herbarium numbers agree with those of *Spec. Plant.* Where the names are in his own handwriting, their authority must be

reckoned as very considerable—a point on which Syme strongly insisted.

Mr. F. N. Williams writes to me:—"Whatever is the righteousness in rejecting the names in Linn. *Sp. Plant.* ed. 2, the expression in all cases of the master's matured ideas, in favour of those found in ed. 1 (e.g., *Adonis æstivalis* and *autumnalis*)? Why should an author be arbitrarily deprived of the right to issue a second edition of his own work?" With this reasoning I fully agree; but the collective wisdom of the Vienna Congress has decided otherwise, and I suppose that, for the sake of uniformity, the consequences must be accepted. Nevertheless, where the description of the second edition amplifies or restricts that of the first, thus showing more clearly what particular plant the author had in view, I do not think that it should be ignored. In some cases two, three, or four sheets are pinned together; the first of these (numbered and named in Linné's handwriting) may be taken as his "type-specimen," the others being frequently different species.

A.—Carex.

C. chordorhiza (sic). This represents 5. *uliginosa;* but the description and localities given in *Spec. Plant.* cannot refer to *C. chordorhiza*, and rather point to *Schœnus compressus* L. (*Scirpus compressus* Pers., 1805; *S. Caricis* Retz., 1779).

6. *C. leporina.* The type-specimen is *C. Lachenalii* Schkuhr (*C lagopina* Wahl.); a second sheet being *C. ovalis* Good., and a third, *C. Schreberi* Schrank (*præcox* Schreb., non Jacq.) *teste* Kükenthal. Syme (*E. B.* ed. 3, x. 101) remarks that "Linnæus appears to have confounded C. lagopina with the very dissimilar C. ovalis, *Good.*, and to have united them under the name of C. leporina, the C. leporina of his 'Flora Lapponica' being C. lagopina, and that of his 'Flora Suecica' being C. ovalis. It is therefore better to reject as ambiguous the name *leporina*, which some authors apply to one and some to the other of these two species." However, Hudson's synonyms and localities show that Linné's contemporaries accepted the name as equivalent to *C. ovalis.*

8. *C. muricata.* Neither the type-specimen nor the description tallies with our plant so-called (*C. contigua* Hoppe). Smith has pencilled against it, "spicata Huds. Mr. P. and Dr. G." [Goodenough]; but I believe that he was mistaken. Dr. P. Ascherson wrote, "C. divulsa var. decipiens Lange = C. Pairæi F. Schultz." It is certainly identical with *Pairæi*, as named for me by Kükenthal, but is not a variety of *divulsa.* If the name *C. muricata* is retained, it must supersede *C. Pairæi; C. Leersii* F. Schultz will come under it as a variety. A second specimen, named *C. muricata* Huds., but crossed through, is *C. echinata* Murr. (*stellulata* Good.).

I think it almost certain that *C. spicata* Hudson (which its author clearly distinguished from *C. muricata* L., and described thus:—"Spiculis subrotundis androgynis contiguis, capsulis ovatis acutis") really represents our so-called *muricata*, and should displace *C. contigua* Hoppe. The citations from Micheli and Ray confirm this view; against it is the habitat, "*in aquosis et ad mar-*

gines fossarum," *C. contigua* being usually a plant of rather dry situations; but, no doubt, like *C. divulsa*, it occurs in both.

11. *C. canescens.* Two very different species are thus named in Herb. Linn. The first (under which is written "Norfolc."), annotated by Smith as "divulsa—Good. & Fl. Brit.," is certainly that. The second bears this inscription:—"11 canescens [queried, in pencil—by Smith?] spiculis subrotundis in summo culmo se contingentibus, brevissime pediculatis," and is *C. fusca* All. (*Buxbaumii* Wahl.); as is an attached sheet, subscribed "Lapp S.," with the addition "canescens vera, J.E.S." The description quoted in *Spec. Plant.* ed. 1, from *Flora Lapponica* 332 does not fit *C. curta* Good. at all; on the other hand, a tracing kindly sent to me by Mr. Britten from Loeselius, *Flora Prussica* no. 32, ad pag. 117, also cited, and named by Loeselius "Gramen Cyperoides spicis curtis divisis," represents a remarkably remote-flowered and subdistichous *curta*. As tending further to prove that Linné did not really regard *curta* as his *canescens*, may be mentioned the reference to Micheli, *Gen.* 69, t. 23, f. 10, in ed. 2:—"Carex nemorosa, fibrosa radice, caule exquisite triangulari, spica longa divulsa seu interrupta, capitulis solitariis præterquam ultimo." *C. curta* is not (or very rarely) a woodland plant, and the above description fits *C. divulsa* admirably.

Additional light is afforded by the specimen in Herb. Linn., given as "10 brizoides," and underwritten "Lapp. S." Against it are pencilled the following remarks of Smith:—"curta Good^{h}"; "canescens Herb. Leche. J.E.S."; "& Herb. Lightf^{t}. Dr. G." It has narrow leaves and pale-brown glumes, thus somewhat resembling the slender Scottish Alpine form of *curta* which has been named by Kükenthal *C. canescens* L. var. *fallax* F. Kurtz; the fruit is not fully formed, but I am inclined to consider it as either *C. Gebhardi* Hoppe, 1826 (*C. Persoonii* Sieb., 1842, *C. canescens* var. *alpicola* Wahl., *C. curta* var. *brunnescens* Pers.) or *C. vitilis* Fr. It should be remarked, *en passant*, that *vitilis* is not known to be a British plant; the original specimen from Lochnagar was almost certainly *C. helvola* Blytt (*curta* × *Lachenalii*), the other alleged localities belonging to *C. canescens* var. *robustior* Blytt or var. *fallax* F. Kurtz. This so-called *brizoides*, evidently mistaken by Linné for the true species of central and southern Europe, is so very near *curta* that he would not have separated it from his *canescens*, had he understood by *canescens* what is commonly supposed.

Although the matter is by no means free from difficulty, I consider that *C. divulsa* has far better claims to be reckoned as *C. canescens* L. (the name is, indeed, quite descriptive of it) than has *C. curta* Good. Considering the presence of *C. fusca* under the same name, and the conflicting testimony of the citations, the best course will be to drop the Linnean name altogether, as too uncertain and ambiguous, and to adopt *C. curta* Good.

12. *C. flava.* This is represented by a well-grown plant, bearing three culms. Female spikelets three, approximate, the male spikelet sessile, springing from between the two uppermost; fruit

much inflated, strongly ribbed, the lower with an abruptly deflexed beak. It is what we have regarded as the type, and differs much in appearance from *C. lepidocarpa* Tausch.

C. distans. Inscribed "Cyperoides, vol. 3, p. 77 [or 22, I am not sure which], No. 5 Seguier." The sheet is, I think, our 'inland-*distans*', and not the coast-plant (*C. neglecta* Degl.).

20. *C. atrata.* Against the type-specimen is pencilled "non vera," and (in another hand) "ustulata" (*atrofusca* Schkuhr), which is correct. The description in *Spec. Plant.* proves that this was an error of identification. An attached sheet consists of two specimens of *C. pulla* Good. and one of young but very characteristic *C. rigida* Good.

19. *C. saxatilis.* The type-sheet (annotated "sic videtur") and a second unnamed sheet are both excellent *pulla.* The citation in *Spec. Plant.* ed. 1, from *Fl. Lapp.* cannot be anything else; nor does the description (quoted from *Fl. Suec.*) appear contradictory. Taking into account the specimen of *C. rigida* above-mentioned, I am convinced that *C. saxatilis* L. ought to displace *C. pulla* Good., rather than *C. rigida* Good.

29. *C. panicea.* The type-specimen is our usual form. A second sheet belongs to var. *tumidula* Laest.; a third (pencilled "Muhlenberg No. 33") contains two distinct, presumably American, species, not at all closely allied to *panicea.*

27. *C. cespitosa* (so spelt in *Spec. Plant.*). The type-specimen consists of two flowering stems, without leaves or root. Fruit veinless; glumes ovate-oblong, much exceeding it (this is contrary to the long description in Fries, *Summa Veg. Scand.* p. 227), blunt, darkish brown (not black) with a paler centre. Certainly neither *Goodenowii, acuta* auct., nor *elata* All. (*Hudsonii* Ar. Benn., *stricta* Good.), and apparently the true plant. A second sheet is good *C. Goodenowii* Gay.

28. *C. acuta.* The type-sheet consists of three culms, all slender and young; the only one sufficiently advanced to repay examination is distinctly tristigmatic, and has the glumes of *C. acutiformis* Ehrh. (*paludosa* Good.) rather than of *C. gracilis* Curt. (*acuta* auct.). On a companion-sheet are two specimens ("ex oriente, Nasselquist") of *C. hispida* Willd. and one of *C. acutiformis*, determined by Ascherson.

From *Spec. Plant.*, ed. 1, I quote rather fully:—

"28. *acuta.* Carex spicis masculis pluribus, femineis subsessilibus, capsulis obtusiusculis. *Fl. Suec.* 769. . . .

Carex spicis erectis oblongis sessilibus alternis foliolo florali brevioribus: superioribus masculis. *Hort. cliff.* 439. . . .

α. nigra. Carex nigra verna vulgaris. *Fl. Lapp.* 330.

Gramen Cyperoides, foliis caryophyllæis, vulgatissimum. *Raj hist.* 1292.

β. russa. Carex spicis masculis superioribus numerosis, femineis inferioribus: intermedia unica androgyna. *Roy.* lugdb. 75. Carex maxima, spicis plurimis remotis longis. *Fl. Lapp.* 329. [There are three other less imporant references under β.]

Habitat in Europa *ubique: α in siccioribus, β in aquosis.*"

While the herbarium evidence is strongly in favour of identifying Linné's species with *acutiformis* Ehrh., the description in *Fl. Suec.* accords better with *gracilis* Curt. Hudson's special description of *acuta* cannot refer to *gracilis*; on the other hand, the publication by Ehrhart proves that he understood *acuta* L. in the generally accepted sense. Perhaps the safest course, that followed by Kükenthal, is to drop the name *acuta*, writing *C. gracilis* Curt. and *C. acutiformis* Ehrh. for the two species affected.

29. *C. vesicaria*. The type-specimen is our *vesicaria*. Attached are two half-sheets; the upper I believe to be very immature *panicea*; the lower is named by Smith "inflata Hud. Mr. Woodw^{d}." Turning to *Fl. Anglica*, ed. 2 (1778), I find *C. inflata* thus described:—"Carex spicis remotis subpedunculatis erectiusculis, mascula erecta lanceolata, capsulis ovatis acuminatis calycis duplo longioribus" . . . "*Anglis*, bottle Carex" (*Bottle Sedge* is still in use for *C. ampullacea*). The Linnean specimen already mentioned is excellent *C. rostrata* Stokes, 1787 (*ampullacea* Good., 1794); the references to Ray and Morison under *C. vesicaria* β. and γ. of *Spec. Plant.*, ed. 1, also appear to mean this species. Apparently *C. inflata* Huds. should be retained for *C. ampullacea* Good.

B.—Epilobium.

1. *E. angustifolium*. This is represented by a weak, narrow-leaved, small-flowered state much like the alleged *E. rosmarinifolium* fron Glen Tilt. I suspect that it was gathered in the far north of Scandinavia.

3. *E. hirsutum* is the ordinary plant; but β. is represented by *E. Lamyi* F. Schultz, as determined by Haussknecht, who identifies *E. virgatum* Fr. with *E. obscurum*; the *obscurum* of Fries being apparently not Schreber's species, but *E. Lamyi*. The description of *E. hirsutum*, β. in *Spec. Plant.* ed. 1, can only apply to *E. parviflorum* Schreb.

5. *E. tetragonum*. The type-specimen is a slender *E. roseum* Schreb., with remarkably narrow, almost linear-lanceolate, leaves. In *Spec. Plant.* ed. 1, the short description runs:—"Epilobium foliis lanceolato-linearibus denticulatis, imis oppositis, caule tetragono. *Sauv. monsp.* 75. Lysimachia siliquosa glabra minor. *Bauh. pin.* 303." In ed. 2, "lanceolato-linearibus" is altered into "lanceolatis." This, to my mind, completely upsets the contention that Linné intended *E. adnatum* Grisebach; especially in view of the omission of the adnate stem-leaves, which afford the most striking specific character. On the other hand, the *E. tetragonum* of *Flora Londinensis* is good *E. adnatum*; and I believe that the name *E. tetragonum* Curt. is unobjectionable.

7. *E. alpinum*. The type is a rather small but well-marked *E. lactiflorum* Hausskn. (determined by Haussknecht). The description in *Spec. Plant.* (ed. 1 and 2):—"Epilobium foliis oppositis ovato-lanceolatis integerrimis, siliquis sessilibus, caule repente" cannot cover *E. anagallidifolium* Lam., but fully agrees with Haussknecht's species; and, by the rule of priority, his name must give way to *E. alpinum* L. "*Habitat in Alpibus* Helveticis,

Lapponicis" merely shows that Linné had not learned to distinguish the Scandinavian and Arctic *E. alpinum* (*lactiflorum*) from *E. anagallidifolium* and *E. alsinefolium*. I may add that the plants figured by Syme as *anagallidifolium* and *alpinum* are both referable to the former.

SOME BRITISH SPECIES OF *PHÆOPHYCEÆ*.

By A. D. Cotton, F.L.S.

The object of the present communication is to bring forward some observations on certain little known or imperfectly described members of the *Myrionemaceæ* and *Ectocarpaceæ*, and at the same time to record three species not hitherto known to occur in this country.

The plants dealt with belong to genera consisting of small and inconspicuous species, concerning the morphology of which our knowledge is still far from complete. To the systematist also these genera offer a fruitful field for investigation, as is shown by the fact that during a short period of collecting, not only were three species added to the British flora, but several unfamiliar forms were met with, some of which may prove to be undescribed. Until our knowledge of the life-history and variability of previously described plants is more complete, the advisability of dealing with the new forms as distinct species is questionable, and for this reason an account of the latter is deferred, and the present notes are confined to species which are already known.

The species recorded for the first time as British are *Ascocyclus affinis* Sved., *Hecatonema diffusum* Kylin, and *Streblonema effusum* Kylin.

Ascocyclus affinis Sved. Östersjöns hafsalgflora, 1901, p. 107, fig. 17.

On *Laminaria saccharina* Lamour. Cawsand Bay, Cornwall, Aug. 1906. New to Britain.

This plant, described by Svedelius in 1901, is a typical *Ascocyclus*, and distinct from any previously known; it does not appear to have since been recorded. The distinguishing features of the species are the size of the ascocysts and plurilocular sporangia, which measure 30–50 × 8–12 μ and 40–50 × 6 μ respectively.

The British specimens agree with the diagnostic characters, except in one particular, *viz.*, the width of the sporangia, a point which will be referred to later. The material was found fairly plentifully on a frond of *Laminaria* which had begun to decay; the spots formed by the plant measured $\frac{1}{2}$–1 mm. in diameter, and were scattered irregularly over the frond between plants of *Myrionema* sp. and *Streblonema aecidioides* Fosl. Specimens of different ages were present, varying from those previous to fructification to those in which the crop of spores had been liberated.

This being the case, an examination of the basal disk was rendered easy, as was also the following out of the different stages.

The basal disk is of the usual *Myrionema* type, but is more irregular than in most species; the cells may be brought out very clearly by staining with gentian violet.* In the young plants the growth is usually regular and even, but in the older parts cases may be observed in which the branching is without definite order; in other instances an almost pinnate arrangement is exhibited, and the outline of such thalli is markedly lobed. The cells of the older parts are usually 6–10 μ wide, and are of the same length or one and a half times longer, whereas the growing cells at the margin are usually 25 × 7–8 μ. True dichotomy of the marginal cells was not observed.

The thallus bears the three organs mentioned by Svedelius, *viz.*, hairs, ascocysts, and sporangia. In the British material these bodies agree precisely with his description, except that the sporangia are usually somewhat larger, averaging 35–55 × 8–10 μ instead of 30–50 × 6 μ. Sporangia of the smaller size also occur, and there is every transition between the two. The sporangia are typically uniseriate; but in the case of some old plants in which the first crop of spores had been liberated, a second crop of sporangia appeared, many of which showed a biseriate arrangement. These biseriate sporangia were, for the most part, of the same size and form as those of the previous crop, though in one or two cases they exceeded them in size.

The development of the ascocysts and hairs agrees with that described for other species of *Ascocyclus*: both appear early, and some may be fully grown before the earliest sporangia develop. In two cases stalked ascocysts were observed, and in another instance an ascocyst had become septate in the upper part. Erect assimilating filaments are usually absent, but in more than one plant a few of these bodies were noted.

Ascocyclus affinis, though a sharply defined species, is thus found, when an examination is made of a considerable number of plants, to vary within certain limits—(1) as to the form of the basal disk, (2) the size and form of the sporangia, and (3) as to the presence or absence of erect filaments.

HECATONEMA GLOBOSUM Batters, Cat. Brit. Mar. Alg. p. 41. *Ascocyclus globosa* Reinke, Algenfl. p. 46; Atlas, p. 20, tab. 17. *Phycocelis globosus* De Toni, Syll. Alg. vol. iii. p. 582; Rosenvinge, Deuxième Mem. p. 86. *Microspongium globosum* Reinke, Alg. der Kieler Brucht, 1888, p. 20. *Myrionema globosa* Fosl. New or Crit. Norw. Alg. 1894, p. 130.

* The best method for making preparations of this and similar algæ is by using glycerine jelly that has been stained with gentian violet, as described by the writer in the *New Phytologist* (vol. i. 1902, p. 129). In the case of the present species the whole plant, after some hours, takes up the violet, the ascocysts and basal disk staining most deeply. This method, successful as it is with *Ascocyclus affinis* and many other species, is of no value for other closely allied plants, which for some reason refuse to take the stain. Effective staining is perhaps dependent on the presence of certain forms of mucilage.

The only previous record of this species in Britain is from the Isle of Cumbrae (Batters in *Grevillea*, vol. xxi. p. 21). The present specimens, collected at Swanage in April of this year, were growing on *Rhodymenia palmata*, and mixed with *Hecatonema diffusum*. The plants were of small size, and of the type described by Rosenvinge on the same host.

Hecatonema globosum is to be found in most of the recent works which attempt to give a complete list of the algæ occurring in the various countries of Europe, and, as will be seen from the citations above, it has been placed in five different genera. Many writers have remarked on its variability, and also on the possibility of more than one species being included under that name. In Reinke's original plant the upright filaments are of considerable length, consisting of 10–14 cells, the sporangia being produced on the ends of the ultimate branches (vide *Atlas*, tab. 16), whereas in the form described by Rosenvinge on *Rhodymenia palmata* (*l. c.* p. 86, f. 20) the filaments are shorter and less branched, the sporangia being borne on short stalks consisting of 1–3 cells. Jonsson also (Mar. Alg. of Iceland. Bot. Tidskrift, vol. xxv. 1903, p. 147) states that he found a form growing on *Rhodymenia palmata* "precisely resembling Rosenvinge's fig. 20, with erect filaments branched or unbranched, and the sporangia stalked or sessile."

The shortening of the branches above referred to brings about a marked difference in the general form of the plant, the typical form producing minute balls (as indicated by the specific name), whilst the form on *Rhodymenia* is flattened, and bears a close resemblance to a *Myrionema*. The present gathering represents the third time this form has been recorded; the records are from three different countries, and in each case the plant was growing on *Rhodymenia palmata*. For these reasons it has been thought advisable to separate the plant, and to regard it as a distinct variety to be characterized as follows :—

H. globosum var. NANUM, v. nov. A typo differt ramis erectis brevioribus parum ramosis, sporangiis sessilibus aut breve pedicellatis. *Rami* erecti circa 100–150 μ longi, simplices vel semel ramosi. *Sporangia* terminalia aut lateralia, sessilia vel pedicello 1–3 articulato suffulta.

With regard to the systematic position, the genus to which the plant was assigned by Batters seems to be the most suitable. *Hecatonema*, as remarked by Sauvageau, possesses the upright growth of an *Ectocarpus*, and the basal disk of a *Myrionema*. The typical form of the present plant agrees with *Hecatonema* in combining these characters, though it differs somewhat in the fact that not only some but all of the thallus cells give rise to upright growth.

HECATONEMA DIFFUSUM Kylin, Algenflora der Schwedischen Westküste, 1907, p. 39, fig. 10.

On *Rhodymenia palmata* Grev., Swanage, April, 1907. New to Britain.

To this species the writer has referred an alga found on *Rhodymenia*, the specimens agreeing in all respects with those described

under that name by Kylin. The plant is allied to *H. maculans* Sauv., but is distinctly smaller. Notwithstanding the well-known variability of form exhibited by the algæ of this genus, the author is inclined to agree with Kylin in regarding the species as distinct, and *Hecatonema* as the best genus in which to place it.

Additional evidence confirming the latter point was afforded by a fragment of *Rhodymenia*, which bore some later stages of the epiphyte. From each of these older plants grew a tuft of Ectocarpus-like filaments of about 1 mm. in length. The filaments gave rise to a few short subulate branches, but no sporangia were observed. The cells in the middle and upper parts of the filaments measure 20–30 × 12 μ, though towards the basal region they are scarcely longer than broad.

There is a remote possibility that the above-mentioned filaments may represent the growth of young *Ectocarpus* plants that had germinated in the centre of the *Hecatonema* tufts. A careful examination did not yield any evidence to support such a view, though to decisively demonstrate organic connection between the two types of algæ is not easy. There is, however, every appearance of such a connection, and this, taken together with the fact that such filaments are present in the allied species *H. maculans*, make it highly probable. In *H. maculans* the upright filaments give rise to sporangia, and there is no reason to doubt the production of similar sporangia in *H. diffusum* if sufficiently late stages could be discovered.

Ectocarpus Padinæ Sauv., Ann. des Sci. Nat. sér. 8, tome ii. 1896, p. 268; Journ. de Bot. vol. xi. 1897, p. 24; *Giffordia Padinæ* Buffham, Grevillea, vol. xxi. 1893, p. 88, tab. 185, figs. 5–7.

The present notes on this plant are confined to the vegetative characters. Material was obtained from specimens of *Padina Pavonia* collected at Torquay (August, 1905 and 1906).

The remarks made by Sauvageau (Journ. de Bot.) as to habit have been fully confirmed; the plant is truly endophytic, the filaments, which are intercellular, growing in the direction of the long axis of the *Padina*. In a section of the latter two entirely different aspects of *Ectocarpus Padinæ* are thus obtained, depending on whether the section be transverse or longitudinal. In the transverse section *Ectocarpus Padinæ* is very inconspicuous, only the transversely cut ends of the filaments being visible, whilst in the longitudinal section its endophytic character is at once apparent; there is little doubt that it was through not examining a longitudinal section that Buffham failed to recognize the true habit of the plant. Drawings made by the writer of the somewhat remarkable endophytic filaments possessed by this species agree in every way with those given in the Journ. de Bot. 1897; the curious foldings in the walls noticed by Sauvageau were also very marked in the Torquay material.

Antheridia and plurilocular sporangia occurred plentifully, but experiments have not so far been conducted with regard to fertilization. Two types of sporangia, as have been described by

Sauvageau, were not distinguished with certainty; it is possible, however, that one or other of these types was absent.

STREBLONEMA EFFUSUM Kylin, Algenflora Schwedischen Westküste, 1907, p. 49, fig. 13.

In *Ceramium rubrum* Ag. Cawsand Bay, Cornwall, August, 1906. New to Britain.

The British examples agree precisely with the plant described and figured by Kylin, which likewise occurred in *Ceramium rubrum*. This species is obviously very closely allied to *S. intestinum* (Reinsch) Holmes & Batt., the type-specimen of which was redescribed by the writer last year (Journ. Linn. Soc. vol. xxxvii. p. 295). Distinguishing characters are difficult to grasp, but *S. effusum* appears to differ in the vigorous habit, with abundant production of sporangia; the latter also are more immersed in the host-plant than in *S. intestinum*.

STREBLONEMA VOLUBILE Thur. in Le Jol. List Alg. Cherb. p. 73; Batters, Journ. Bot. vol. xxxiii. 1895, p. 276.

A species of *Streblonema* was observed in *Dudresnaya coccinea*, which, though not determined with certainty, is worthy of notice.

S. volubile Thur. was first described and figured by Crouan in 1851. It possessed the usual type of creeping filaments, the sporangia were large, ellipsoid, and unilocular; no other form of reproductive organs was observed. The plant has been noted since by various writers, but in no case has a plurilocular sporangium been found in connection with those of the type above referred to.

In 1895 Batters (*l. c.*) recorded the plant as British, and drew attention to its presence in *Dudresnaya* in various specimens preserved in herbaria. At the same time he gave an account of a *Streblonema* found by Buffham in *Gloeosiphonia*, and which he doubtfully referred to *S. volubile* Thur. This plant possessed plurilocular sporangia, which were described as varying in shape from roundish or oval to spindle-shaped, and from 20–70 μ in length, and usually 18–21 μ wide in the broadest part.

The plant referred to in the present note, which also possesses plurilocular sporangia, would appear to be different to that collected by Buffham. The sporangia are very small, 1–2-seriate, and are frequently found in clusters of two or three together. Their average measurement is 30×12 μ, but they may be found to vary within the limits of $20–40 \times 10–15$ μ. The cells of the vegetative portion of the plant also are very small, and are more uniform than usual in species of *Streblonema*; their measurements rarely exceed $20–30 \times 10–15$ μ. Five to seven chloroplasts are present in each cell.

Buffham's plant in *Gloeosiphonia* and the present plant in *Dudresnaya* are almost certainly distinct. Mr. Batters (the news of whose lamented death has just been received), who was kind enough to examine the latter and to compare it with Buffham's slides in his herbarium, stated that as far as he could see the one would appear to come as near the true *S. volubile* as the other. Until, however, further information is forthcoming, it is impossible to speak definitely.

Two distinct forms, therefore, have been tentatively referred to *S. volubile*, and it remains for further investigation to decide which, if either, of these determinations is correct. *Dudresnaya* is not difficult to obtain in certain localities on the south coast, and *Streblonema*, when present, is readily recognized by the brown coloration formed in the *Dudresnaya* fronds.

NOTES ON *POTAMOGETON*.

By Arthur Bennett.

Potamogeton floridanus Small, Fl. S. E. United States, 37 (1903). The following note by Dr. Morong (Bull. Torrey Bot. Club, xiii. 145 (1886)) applies, I believe, to this plant:—"Mr. Curtiss also sent what appears to be a peculiar form of *P. natans*. It has small, acute, elliptical leaves, 4–6 cm. long by 5–15 mm. wide, and erect peduncles about 6 cm. long. It looks exactly like specimens in the Torrey Herb. from India, which are labelled *P. natans*, var." The above note is appended to a description of *P. Curtissii* Morong from the Blackwater River, the habitat of Dr. Small's species. I have little doubt that Dr. Morong's and Dr. Small's are the same species, and I think it likely it may be my *P. Tepperi* (Journ. Bot. 1887, 178), which has much the facies of a small *natans*, and is often so named. If the Torrey Herbarium specimen is from the "Khasia Hills, alt. 4–5000 ft.," collected by Hooker and Thomson, it is *P. Tepperi*, which at present is recorded only from Asia and Australia.

Altitudes of Potamogetons.—The following list of altitudes of various species is a contribution to a subject that is little attended to in the genus. In all cases I have seen specimens, with the exception of those of the Geol. Exped. 40th Parallel, Botany, 1871, Washington:—

P. natans L. Britain, 2500 ft.; Turkestan, 6000 ft.; India, 9000 ft.; California, 6000 ft.

P. polygonifolius. Britain, 2200 ft.

P. americanus Cham. Nevada, U.S.A., 6000 ft.

P. Tepperi A. Benn. Khasia (India), 4–6000 ft.

P. fluitans Roth. Sikkim (India), 9000 ft.

P. indicus Roxb. India, 1–7000 ft.

P. Cheesemanii A. Benn. New Zealand, 2500 ft.

P. lucens L. Britain, 1100 ft.; Spain, 9750 ft. India: Kumoan, 6400 ft.; Kashmir, 5–6000 ft.

P. prælongus Wulf. Britain, 2500 ft.; France, 1730–2690 ft.; Jura, 3500–3800 ft.; Switzerland, 6500 ft.

P. angustifolius Bertch & Presl. India: Kashmir, 5150 ft.; Himalayas, 6400 ft.

P. heterophyllus Schreb. Britain, 1600–2300 ft. U.S.A.: Montana, 7500 ft.; Utah, 10,000 ft.

P. alpinus Balbis. Britain, 1500–3300 ft.; Switzerland, 6000 ft.; Austria, 4500 ft. U.S.A.: Colorado, 8400–11,370 ft.

P. foliosus Rafn. U.S.A.: Utah, 4300–7500 ft.

P. diversifolius Rafn. Mexico, 6–8000 ft.

P. perfoliatus L. Britain, 1100–2300 ft. Asia: Pamirs, 8700–12,350 ft. India: Kashmir, 5–6000 ft.; Kumoan, 6–13,000 ft.; Tibet, 8–15,000 ft. N. America, 4000 ft.; Nevada, 9000 ft.; Utah.

P. crispus L. Britain, 750 ft.; Tirol, 2000 ft. India: Punjab, 3000 ft.; Kashmir, 5150 ft.; Pamirs, 12,350 ft.

P. densus L. Britain, 1020 ft.

P. obtusifolius Mert. & Koch. Britain, 600 ft.; N.W. Himalayas, 9000 ft.

P. pusillus L. Britain, 1100 ft. India: Patna, 5180 ft.

P. pectinatus L. Britain, 600 ft. India: 1000 ft.; Tibet, 15–17,000 ft.; Pamirs, 13–14,000 ft. U.S.A.: Dakota, 3413 ft.; Nevada, 6000 ft. S. America: Venezuela, 15,500 ft.

P. filiformis Pers. Europe, 6500 ft.; Hautes Alpes. India, 7700 ft.; Pamirs, 13,000 ft. U.S.A.: Nevada, 6000 ft.

P. latifolius Morong. U.S.A.: Nevada, 4000 ft.

P. strictus R. A. Phillipi. Chili, "24° 8′ S. lat.," 10,700 ft.

P. confervoides Reich. U.S.A.: New Hampshire, 3000 ft.

P. pamiricus Baagöe (in Vid. Medd. For. Kjob. 181, 1903). Asia: Pamirs, 13,000 ft.

P. amblyophyllus Meyer (in Vid. Medd. For. Kjob. 181, 1903). Asia: Pamirs, 8700–12,350 ft.

P. LUCENS L. Specimens sent by Dr. Small from Florida (Coll. Messrs. Small and Carter, Nov. 1903) are of a stronger growing form than those of the New England States, but not varying sufficiently to be named; but others are very distinct, and I propose to name them.

P. LUCENS L. var. FLORIDANUS. A very odd form of *lucens*, characterized by an almost simple stem, with long internodes; leaves lanceolate ($2\frac{1}{2}$ inches × $\frac{7}{8}$ inch), the apex excurrent into a short, moderately hard spine, margins strongly undulated; stipules strong, persistent; peduncles 6–7 inches long. "Everglades back of Miami, Florida, 17, 11, 1903." The exactly lanceolate leaves are very unlike any *lucens* forms from the New England States or Canada. In Europe, branches are often thrown off from the flowering-stem with short leaves; but these are almost invariably rounded at the apex, and quite unlike these Florida specimens. Many Asiatic specimens have these short leaves, but they also are rounded; while others, from Manchuria, have linear-lanceolate leaves drawn out to an acute point at the apex.

P. NATANS L., P. POLYGONIFOLIUS Pourr., P. COLORATUS Horn. Some remarks made in an excellent paper by Mr. West (Proc. R. Soc. Edinb. xxv. 967, 1905) remind me that in the *British Flora*, ed. 8, 484 (1860), Dr. Arnott disposes of the three as only really one species. Now, if *polygonifolius* is (as suggested) a degraded *natans*, how comes it they grow side by side in the Isle of Stroma, each exactly retaining its characters? or why should not the

reverse be pleaded?—*natans* as a higher form of *polygonifolius*. Again, altitude is suggested as making some modification; certainly it does to some extent, especially if in shallow water, but I have *P. natans* from India from 9000 ft. altitude (Duthie) indistinguishable from Surrey specimens; and so with other specimens.

P. OCHREATUS Raoul! in Ann. Sc. Nat. ser. 3, ii. 117 (1844), and Choix, Pl. Nouv. Zel. 13 (1846).

P. gramineum R. Brown! Prodr. Fl. N. Holl. 343 (1810), non L.

P. obtusifolius Bentham! Fl. Austral. vii. 172 (1878).

A form (*latifolius*) of this species occurs in the Murray River, South Australia (*leg.* Tepper), with leaves double the normal width, 1 dm. long, and with forty-five nerves or veins.* None of the New Zealand specimens approach this, nor do the Centinneal Park specimens, N.S.W. Australia (*leg.* Maiden), though larger in all parts than most examples of the species.

In habit the species is variable; specimens from Australia Felix (F. v. Mueller) are straggling in growth, while those from the Yarrogobilly River, N.S.W. Australia (*ex* Maiden) have shorter internodes with fascicles of leaves in the leaf-axils; peduncles $2\frac{1}{2}$ cm. long; spikes $1\frac{1}{2}$ cm. Others from the Waihi Stream, North Island, New Zealand (*leg.* Cheeseman), have long internodes, no fascicles of leaves, and peduncles 1 dm. long, and spikes $2\frac{1}{2}$ cm. long; and Moreton Bay examples come between these.

Raoul's description was made from specimens from the Banksian Peninsula, New Zealand.

Additional Australian stations to those given by authors will be found in the *First Government Report* (1853), by F. v. Mueller, p. 30.

× P. VENUSTUS Baagöe in Actes Congr. Internat. Bot. Paris, 1900, p. 516 (*P. alpinus* Balb. × *P. crispus* L.). Hab. in parte amnis "Gudenå" qui Lilleå vocatur Jyllandia, 1899; in rivulis "Vigersdalå," Saëllandie, 1899.

For specimens of this remarkable plant I am indebted to the late Mr. Baagöe, of Naerstad, Denmark. The habit is that of *alpinus*, but with the nervation nearer *crispus*; the leaves are not serrated, the peduncles and spikes are those of *alpinus*, and the upper leaves are suffused with red in the same way; the stems are also compressed, though in a less degree than in *crispus*.

Though quite willing to question its hybrid origin, I do not see how to avoid that conclusion; the plant cannot be placed with either *crispus* or *alpinus*, and I am not prepared to suggest it as a new species, as the condition of the spikes suggests hybridity.

× P. RIPENSIS Baagöe in *l. c.* (*P. zosterifolius* Schum. × *trichoides* Cham.). Distributed by Mr. Baagöe as *P. zosterifolius* Schum. f. *gracilis*. Hab. in amne Nibså, prope Ribe, Jyllandia, Denmark, 1899.

I accept this name on Mr. Baagöe's authority. There are no

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* In original examples (*leg.* Raoul) the veins are thirty to thirty-five.

signs of any peduncles in my specimens, and looking to the great difference in width of leaves assumed by some of the *graminifolius* section I am not convinced that this is not a remarkable narrow-leaved form of *zosterifolius*. Mr. Baagöe also sent a form of *zosterifolius* named *angustissimus* from Varming in Jyllandia (1899). In this the leaves are even narrower than the last; but the whole habit is different, and so far as the immature spikes show, it is rightly referred to *zosterifolius*. The stipules are quite free, while in the last they are closely appressed to the stems.

Another plant sent by Mr. Baagöe as *crispus* × *rufescens* I cannot separate from *rufescens* (*alpinus*), having gathered just such specimens among the many *alpinus* that I have collected.

P. MASCARENSIS Cham. in Linnæa, ii. 228 (1827).

P. natans L. b. *mascarensis* Kunth, Enum. iii. 128 (1841).

This species (?) seems to be extinct, like so many of the Mascarene birds, as I cannot find it has been collected of late years. Beyond the specimen in the Berlin Herbarium, I know of only two others, one in the Paris Herbarium, and one in Delessert Herbarium (labelled "*P. natans* L. Dans la rivière de Regiout, Oct. 1832. Bové."). That at Berlin came from Kunth, who had it from the Paris Herbarium in 1820.

Dr. Johnstone, who resided on the Island of Mauritius, had no such plant among the Potamogetons he kindly sent me.

P. ROBBINSII Oakes in Hovey's Mag. vii. 180 (1841). On fruiting specimens this species produces small spathulate leaves, 2 cm. long × 3 mm. wide; these occur at the base of the peduncles, similar in character to those on *P. panormitanus* Bivoni, only of thicker texture.

So far as I have seen these are not noticed in any North American Flora, and Mr. Hill's plate (Bot. Gaz. xxv. 148 (1898), t. 15) does not show them, although the very rare fruits, which are winged on the central carina, are there well represented. I do not find any of these leaves on my specimens of *P. Maackianus* Ar. Benn. (*P. serrulatus* Reg. et Maack., non Opiz, nec Schrader), but specimens in fruit are so rare that it is not perhaps safe to assume they do not occur.

Though so common in at least fifteen of the United States, especially in Massachusetts, its life-history has yet to be written, and would afford an excellent study. But this must be done in the field or by cultivation; dried specimens only afford a few phases of plant-life, and that mostly in the condition in which they can best be specifically determined; the spring and winter states are rarely represented. Mr. Hill (*l. c.*) considers this species one of the best defined and least variable of North American Potamogetons. An additional station to those on record where it has been found in fruit is "Duck Lake, Whitehall, Mich.," Hill sp. Before 1880 only one fruit was known, but in that year it was found by Mr. Faxon in Massachusetts, and in 1889 by Prof. Macoun in the Somas River at Alberni, Vancouver Island.

P. SPATHULÆFORMIS Morong in Mem. Torr. Bot. Club, iii. pt. 2

26 (1893). In this Journal for 1889 (p. 33, t. 286) Mr. Fryer described the above plant under the name of "*P. varians* Morong in herb. ined."; and the Messrs. Groves use this name in the 9th edition of Babington's *Manual*. This name was used because in letters and specimens he sent to me Dr. Morong employed it, and we supposed he intended to publish it.

The earliest name, however (see Journ. Bot. 1900, 130), is *P. spathæformis* Tuckerman ex Robbins in A. Gray, Man. Bot. ed. 5, 487 (1878). In his description Mr. Fryer discusses its hybrid origin (as *heterophyllus* × *Zizii*). Dr. Morong says: "A weighty argument against this view is the fact that neither of the supposed parents occur in Mystic Pond [its original locality], and that it should be produced in localities separated by the Atlantic Ocean."

Certainly the curious part of its hybrid reference is (as Mr. Fryer mentions) that, although there exists a certain difference in the North American forms *angustifolius* (*Zizii*) and *heterophyllus* that can hardly be put on paper, yet is easily recognized by the eye, the *varians* of America is the *varians* of Britain, save for very minor differences. Ascherson & Graebner make it *Zizii* × *heterophyllus*, though the land form gathered in a ditch in Cambridgeshire that had not been dry for thirty years before is essentially towards *heterophyllus*. Messrs. Ascherson & Graebner record it from Silesia, the Rhine Province, and Sweden. I have it from Ireland (Donegal, 1889, H. C. Hart), and Miss Armitage gathered it in Pembroke * in 1902. In America the variability of the plant is remarkable. Dr. Morong sent me a series of specimens "collected in one season from July 10th to Sept. 25th, that you may see how singularly the plant varies during the season; all from the same spot." The actual dates being July 10th–25th, August 11th, Sept. 1st–15th, 25th.

Beyond the reference by Dr. Morong in his N. Am. Naiad. 22 (under *P. Faxoni*) and 27 (under *P. spathulæformis*), I do not think there is any suggestion (other than my own in this Journal for 1900, 128) with regard to hybridity in this genus in America. But Dr. Hagström considers he has some North American hybrids.

SHORT NOTES.

Pollen of Hybrid Violets.—A short account of some observations which I have made during the last two seasons upon the pollen of various hybrid violets may be interesting. Opinions have been expressed that the pollen of hybrid violets is always abnormal—ill-shaped and devoid of protoplasmic contents—whereas my investigations lead me to believe that, although some such grains may be thus described, the majority are spherical in shape, quite sound and full. The first plant I examined was the hybrid *Viola odorata* ×

* Given as Glamorgan in error in Supp. to Top. Bot. 85.

hirta. Here the pollen-grains, taken from the unopened flowers and examined under a one-eighth inch objective, were certainly small and ellipsoidal, with a few exceptions which appeared to be normal. *V. floribunda* Jord. is considered by some writers to be a hybrid between *V. odorata* × *hirta*: I believe, however, that it is in reality a good species. In this case, and in that of a plant from Banwell, Somerset, with red-purple, highly scented flowers (which I take to be a cross between *V. subcarnea* and *V. hirta*) unmistakably sound pollen is produced. In *V. ericetorum* × *stagnina* (an acknowledged hybrid) from Wood Walton Fen, the pollen-grains, examined in water under the microscope, were found to be spherical, and filled with protoplasmic contents. After remaining some time in water (one to three days) some of the grains were found to be bluntly triangular, with a pore at each angle, somewhat simulating the pollen of *V. cornuta*. This condition probably marks the commencement of germination, and the emission of the pollen-tube. It is clear therefore that, although certain hybrid violets are infertile, the abortive development of the pollen cannot always be regarded as a diagnostic character in discriminating between the true species and the hybrid.—E. S. Gregory.

Ophrys Trollii (p. 343).—There is what looks like an excellent figure of an original specimen (in the herbarium of the Zurich Polytechnic), said to be the only coloured one yet published, in Max Schulze's *Die Orchidaceen Deutschlands, Deutsch-Oesterrichs und der Schweiz* (Gera-Untermhaus, 1894). The German description may be translated thus:—"Tubers roundish, stem four-leaved. Spike three-flowered. Bracts lanceolate, large, longer than the germen. Outer perigon-leaves lanceolate, acuminate, about as long as the germen, reddish outside with green nerves, rose-red inside; the two lateral inner perigon-leaves two-thirds the length of the outer, linear, brownish. Lip three-lobed; lateral lobes short, linear, yellow; central lobe narrowly lanceolate, elongate, long-acuminate, neither emarginate nor reflexed, with a purple-red stripe in the middle, yellow at the margin. Column greenish, with a nearly straight, green, linear, pointed beaklet. By the old castle of Wülfingen, near Winterthur, in Switzerland; not refound." This description was made by Hegetschweiler from the original drawing; he considered it to be intermediate between *O. fuciflora* and *O. muscifera*. Regel thought it a hybrid between them; but M. Schulze remarks that "this conclusion is contradicted by the long-acuminate outer perigon-leaves, and the narrow, long-acuminate central lobe of the lip." Reichenbach fil., who regarded it as a variety of *O. apifera*, due to deep shade, described it in his *Iconographia* as having the lip acute, triangular, long; lateral lobes more or less undeveloped. He also gave this name to plants found near Jena by M. Schulze, who would, however, rather regard them as transition-forms. Thus it is fairly clear that the Winterthur specimens represent the extreme of a series. Not having seen any of the British plants which have been so named, I cannot offer any opinion as to their correctness; but the beautiful plate referred to above is quite different from any

O. apifera that I have come across, either fresh or dried.—Edward S. Marshall.

P.S.—Since writing the above, Mr. J. W. White has kindly lent me an excellent pen-drawing by Miss F. Cundall of the Bristol plant, which is clearly a variety of *O. apifera*, differing from type only in the lip. It agrees well enough with the description of var. *Trollii* Reichb. fil., but is not by any means identical with *O. Trollii* Hegetschw. That has the bracts much longer and more leafy, the sepals narrower and more acute, the lip about half as broad at the base, more tapering, and rather longer. The colour, as represented in M. Schulze's figure, is also brighter than that of *O. apifera*.—E. S. M.

Ranunculus divaricatus Schrank.—In the "List of Seed-plants and Ferns" Mr. Britten and Dr. Rendle have, in deference to the opinion of Continental botanists, adopted the name of *Ranunculus divaricatus* Schrank for the species heretofore generally known in this country as *R. circinatus* Sibth. It appears to us, however, that the name of *R. circinatus* should be retained, and to elucidate the point a review of the evidence seems desirable. At the outset we would recall the fact that Mr. Hiern, whose opinion on such a question must carry great weight, in his paper on the "Forms and Distribution of Batrachium" (Journ. Bot., 1871) referred *R. divaricatus* Schrank to *R. trichophyllus* Chaix, quoting *R. divaricatus* Koch, *non* Schrank, as a synonym of *R. circinatus*. In a recent letter to us Mr. Hiern has pointed out that *R. trichophyllus* Chaix and *R. divaricatus* Schrank are both founded on the same plant, *i. e.* Haller's No. 1162. In publishing the former name, Chaix (in Villars Hist. Pl. Dauph. i. p. 335, 1786) gives no description, merely quoting "Hall. 1162." Schrank's original description of *R. divaricatus* (Baiers Fl. ii. 104, 1789) is as follows:—"Der Stengel schwimmend; Die Blätter zusammengesetzet, tellerförmig; die Theile haarförmig, auseinanderstehend. Auseinanderfahrender Hahnenfusz. Ranunculus caule fluitante, petiolis unifloris, foliis capillaribus, laciniis divergentibus. Hall. hist. n. 1162. Fœniculum aquaticum Tabern. 187, ganz gut." Schrank's diagnosis is equally applicable to *R. trichophyllus* and *R. circinatus*, with the exception of the term "tellerförmig," *i. e.* salver-shaped, which more aptly describes the leaves of the latter species, with the segments branching laterally only, than those of the former, where the branching of the segments is not in one plane. This appears to be the only point in favour of *R. circinatus* being intended. When we come to examine the citations from other authors the evidence seems overwhelmingly in favour of the opposite view. To begin with, no one having *R. circinatus* in view could possibly refer to Tabernæmontanus's figure as "entirely good," it being in fact an excellent representation of *R. trichophyllus*. Again, the citation of Haller's type brings in Barrelier Ic. 566, which is also *R. trichophyllus*. The strongest point, however, in favour of *R. circinatus* only not being intended by Schrank is that Haller described a var. β of his No. 1162, which from his citing Plukenet's figure (t. 55, f. 2) there is little doubt is

intended for *R. circinatus*, and if Schrank discriminated *R. circinatus* he would have quoted the var. *β* rather than the type. It may therefore be concluded, we think, that Schrank did not discriminate between *R. trichophyllus* and *R. circinatus*, but that he merely took up Haller's species, which had been already named *trichophyllus* by Chaix, and this being the case, it appears to us that *R. circinatus* Sibthorp must stand.—H. & J. Groves.

New Variety of Spergula arvensis L.—A small form of *Spergula* has been under consideration for some years, sent me from Guernsey first by Mr. J. W. White in 1890, when I wrote out a description of it, thinking it was at least new to Britain. For several years I waited for fuller material, and for ripe fruit; and then in the same season fruiting specimens were given me by Mr. White from Jersey, and Miss Dawber from Guernsey. I sowed some seed at once, but only one plant escaped slugs, and that came on too late and died before flowering. This plant, however, maintained the dwarf habit, and was prostrate in this early stage. The seeds being densely papillose bring it under var. *vulgaris* Koch. My thanks are due to Mr. E. G. Baker for comparing my specimens with those in the British Museum of var. *glutinosa* Lange, which differs from the new variety in being a larger plant, densely glandular pubescent and in the seeds being white-margined; and also for giving me the original description of var. *gracilis* E. Petit, which is chiefly distinguished by the *acute* sepals. I append a description:—

Spergula arvensis L. var. nana, nov. var. Stems several, 1–6 in. long, prostrate or decumbent, usually very short. Leaves $\frac{1}{8}$–$\frac{1}{2}$ in., rigid, about as long as the internodes. Flowers $\frac{1}{6}$ in. diam. at the base of the few-flowered cymes, smaller upwards; sepals broadly ovate-oblong, obtuse, glandular-pubescent on the back. Capsules subglobose, lowest (largest) $\frac{1}{8}$ in. diam., smaller upwards, on pedicels twice as long, more or less; seeds densely papillose, smaller than the type, wing black. This variety grows on dry spots near the shore in Guernsey and Jersey, and is soon over, flowering in April and even in late March, and fruiting in May. It is not much earlier than the type, which also fruits in May in dry sunny spots in Hants and Dorset, but the latter goes on springing up through the summer and autumn and fruiting as late as October and November.—E. F. Linton.

Calamagrostis lanceolata Roth in Essex.—This plant, which is queried for Essex in Top. Bot., I saw in August growing sparingly on the swampy border of a pond in the parish of Maplestead, North Essex.—G. Claridge Druce.

Branching in Palms.—Mr. Ridley has a paper on this subject in the *Annals of Botany* for July, which contains observations additional to those published by Sir D. Morris in Journ. Linn. Soc. xxix. (1892). Neither writer refers to the interesting note by Mr. H. O. Forbes published (with a plate) in this Journal for 1879, p. 193, on a cocoa-nut palm which at about that date had twenty-five living axillary branches, with scars of fifty-two.

PARIETARIA OFFICINALIS L. (Journ. Bot. 1906, 429; 1907, 34).—Dr. Vigurs points out that the action of the stamens in this plant was fully described by Curtis in the *Flora Londinensis*, who says: "The curious manner in which these flowers shed their pollen, or fertilizing dust, is known to most botanists, but may be new to some of our readers; each filament has a peculiarity of structure which renders it highly elastic; there are four of them in number; on their first appearance they all bend inward; as soon as the pollen is arrived at a proper state to be discharged, the warmth of the sun, or the least touch from the point of a pin, will make them instantly fly back with a degree of force, and discharge a little cloud of dust. This process is best seen in a morning when the sun shines on the plant, in July and August; if the plant be large, numbers will be seen exploding at the same instant."

ARCHIBALD SINCLAIR.—In the parish churchyard, Penarth, Glamorgan, there is a well-preserved tomb bearing the following inscription:—"Sacred to the memory of Archibald Sinclair of the town of Cardiff, who was one of the Harbingers of His Majesty George III., a justly celebrated and scientific botanist. He died Oct. the 7th, 1795, aged 64 years." I can find no reference to his work either in the *Biographical Index* or elsewhere, and should be glad to obtain some indication of his claim to the position he appears to have held among his contemporaries.—A. H. TROW.

[The name of Archibald Sinclair was previously unknown to us, and we have been unable to find any reference to him in botanical literature.—ED. JOURN. BOT.]

SOUTH LANCASHIRE NOTES.—I have found *Sparganium neglectum* Beeby in two localities near Walton recently. Since its discovery in West Lancashire by Messrs. Salmon and Thompson (Journ. Bot. 1902, p. 295) it has been detected in several fresh localities in the county, and it seems very probable that many of the stations for *S. ramosum* will be found to refer to this plant. A quantity of *Senecio viscosus* L. appeared in August on railway banks near Walton. The ground had been disturbed to make a temporary railway siding, but no fresh ballast was brought, so far as I could ascertain. The plant had certainly not occurred in this locality previously, as I have visited it several times a year for the past ten years. I have since learned that the Rev. S. Gasking has also found it this year on railway banks near Fazackerley, about two miles away. It is not recorded for the Lancashire side of the Mersey in the *Flora of Liverpool*.—J. A. WHELDON.

ORCHIS PYRAMIDALIS IN CO. DOWN.—Whilst botanizing recently in company with Mr. J. Glover, in the woods of Mount Stewart, near Grey Abbey, Co. Down, we observed *Orchis pyramidalis* L. in fair quantity at one point. In the *Cybele Hibernica* the only record for the county is "Ballyholme '73, two plants."—A. A. DALLMAN.

NOTICE OF BOOK.

The Trees of Great Britain and Ireland. By Henry John Elwes, F.R.S., and Augustine Henry, M.A. Edinburgh: Privately Printed. Vols. I. & II.: 1906–7. Price £3 3s. each.

These handsome volumes, the result of much knowledge and investigation, provoke a feeling of regret that, being in many respects so good, they should not have been better. The authors have spared neither trouble nor expense; they have brought together a vast amount of information, much of it, in Dr. Henry's portion, hitherto unpublished; the work is well printed on good paper; the plates are numerous—sixty to each volume—and well chosen. And yet it must be said that, for want it would seem of a little consultation with folk versed in the arts of book-arrangement and book-production, the volumes as a whole distinctly fall short of the comparative perfection which they might easily have attained.

There is only one work with which this can fairly be compared, and that is Prof. Sargent's admirable *Silva of North America*. With such a model before them, it is difficult to understand why Mr. Elwes and Dr. Henry departed from it; for wherever they have done so it has been a departure for the worse. Prof. Sargent's book is arranged systematically; each description begins with a brief diagnosis, followed by a full bibliography: then comes a detailed description, with copious footnotes on the early history of the species, with incidental references to points of interest connected with structure, fertilization, and other matters, and, when the name is commemorative, a short but excellent biography of the person commemorated; each volume contains an excellent index. Mr. Elwes and Dr. Henry adopt no kind of arrangement—the first four genera treated are *Fagus*, *Ailanthus*, *Sophora*, and *Arancaria*; there is no index to the volumes, and the table of contents is not arranged alphabetically, so that one must run through it in order to know what is and is not in the book: even species belonging to the same genus appear in different volumes. The authors might at least, by beginning each genus on a right-hand page, have afforded purchasers an opportunity of arranging the work for binding in systematic order, but this has not been done. The bibliography is comparatively poor; the descriptions are full and doubtless excellent, the distribution is very well done, and there is ample evidence of a wide acquaintance with the literature of the subject; but we miss the miscellaneous but always pertinent notes which give an air of completeness to Prof. Sargent's work.

The care in small details which adds so much to the appearance of a book is manifest in the typographical arrangements, as well as in numberless small points which catch the eye on every page: e.g. "var. *Floridana* (*Taxus floridana*)" (i. 100)—the same name cannot correctly have a capital and a small initial; "Schl." (p. 101) is not a correct abbreviation for Schlechtendahl, nor is it right to cite "Schlechtendahl, *Linnæa*"—it should be

"in *Linnæa*"; "var. *Chesthuntensis*" (p. 111, twice), "raised by William Paul of the Cheshunt Nursery," should of course be *Cheshuntensis*; "Lee's *Botany of Worcestershire*" (p. 148), "Mr. R. Claridge Druce" (p. 153), "Ray, *Synopsis* 542" (p. 148)—there are only 482 pages in the book!

A more serious example of want of thoroughness will be found in the "List of reported Mistletoe-bearing Oaks in England" (vol. ii. p. 334); Mr. Elwes, who is responsible for the list, seems to have drawn it up in the most perfunctory manner. The subject is of sufficient interest to justify some historical research, but the earliest date in the list is 1857. No fewer than seven instances are included on the authority—surely neither original nor confidence-inspiring?—of "*Leisure Hour*, 1873" (apparently the date of publication); one at least might have been entered on the more satisfactory testimony of Mr. Townsend (see *Fl. Hampshire*, ed. 2, 189). The writer of this notice may be pardoned for feeling astonished to find himself entered as the authority for its occurrence near Plymouth in 1884, seeing that neither then nor at any other time has he been in that neighbourhood; it would seem that for "Britten, 1884" should be read "Lees, 1854" (see *Phytol.* n. s. i. 192), but this, according to Briggs (*Fl. Plymouth*, 178) was an error. Here, again, the arrangement is slipshod; no attempt has been made to bring the localities in one county together, and in some cases the county is not mentioned.

As will have been gathered from some of the names quoted, the title of the book is somewhat misleading; "the trees of Great Britain" are to be understood as including "all which grow naturally or are cultivated in Great Britain, and which have attained, or seem likely to attain, a size which justifies their being looked on as timber trees." Most of these the authors tell us, they "have seen with [their] own eyes and studied on the spot, both at home and abroad"; and the result is a mass of authenticated observation such as has seldom been brought together. The defects which we have pointed out, so far as these are remediable, will, we hope, be absent from future volumes, each of which, we trust, will be supplied with a proper index; those of arrangement, we fear, cannot be obviated, and they must interfere with the ready consultation of the work.

JAMES BRITTEN.

BOOK-NOTES, NEWS, &c.

UNDER the title *Memorials of Linnæus*, Dr. Rendle has prepared and the Trustees have published a Guide to the collection of portraits, MSS., specimens and books exhibited at the Natural History Museum to commemorate the bicentenary of Linnæus's birth. The exhibition contains objects lent by the Department of MSS. British Museum and by the Linnean Society, as well as others, including the original specimen of *Linnæa* collected at Lycksele in Lapland by Linnæus on May 29, 1732 and sent by

him to Gronovius with the suggestion that it should bear his name, from the Department of Botany. The Guide, which contains two portraits of Linnæus, costs 3d., by post 4d.

The New Zealand Government has published an interesting report of the botanical survey of Kapiti Island undertaken by Dr. L. Cockayne in October, 1906. The report is accompanied by a number of excellent illustrations from photographs showing aspects of vegetation, with a list of the indigenous and introduced plants in which we note that Kirk's *Sonchus oleraceus* var. *littoralis* is raised to specific rank as *S. littoralis*. We think the Vienna rule as to the employment of capitals for names derived from persons should have been observed; we are glad to see that Kew has now fallen into line in this respect.

Two parts have been issued of Mr. Ridley's *Materials for a Flora of the Malayan Peninsula*, dealing with the monocotyledons. Of the value of the book, to which we may recur, there can be no doubt; but it is to be regretted that the convenience of those who use it has not been more carefully considered. Each part is paged separately, but has no index; the name of neither order nor genus appears at the top of the pages, which are occupied merely by repetitions of the title of the work. It is strange that matters of this sort are so constantly overlooked—*e. g.* in the indexes to the monographs of *Das Pflanzenreich*, the genus-name is always omitted from the headings of the index pages, thus hindering ready consultation.

The number of the *Journal of the Linnean Society* (Botany, xxxviii. 263) issued on July 11 marks the adoption of a new *format*: the increase in size undoubtedly gives it an appearance of greater importance, and must be regarded as an improvement. The number contains an interesting paper, with plate, by Mr. Hemsley on a three-spurred variety of *Platanthera chlorantha* which he names *tricalcarata*; it was found by Miss D. R. Wilson near Sherborne, Dorset, in June 1906. Only one specimen was observed, and it may be doubted whether the abnormal condition deserves a varietal name. Other papers are on *Hallieracantha*, a new genus of *Acanthaceæ*, by Dr. Stapf; on the systematic position of *Hectorella cæspitosa*, by Dr. A. J. Ewart; on the origin of Angiosperms, by Messrs. Newell Arber & John Parkin; and a general report on the botanical results of the third Tanganyika expedition, conducted by Dr. W. A. Cunington in 1904–5, by Dr. Rendle.

Mr. A. W. Hill publishes in the *New Phytologist* for "June and July" (published in September) an interesting paper, illustrated by an excellent plate, on "The Natural Hybrid between the Cowslip and Oxlip." The *New Phytologist* will in future be published at the Botany School, Cambridge.

Dr. Theodore Cooke's careful *Flora of the Presidency of Bombay* is rapidly approaching completion; the recently issued part brings the enumeration down to the beginning of *Araceæ*.

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INDEX ABECEDARIUS,

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CONTENTS

PAGE

Edward Arthur Lionel Batters. (1860–1907.) By A. & E. S. Gepp (with Portrait) 385

Notes upon Hind's *Flora of Suffolk*. By C. E. Salmon, F.L.S 388

A Natural *Berberis*-Hybrid in England. By Rev. E. S. Marshall, M.A., F.L.S. 393

Notes on the Flora of the Channel Islands. By G. Claridge Druce, M.A., F.L.S 395

New Chinese Plants. By S. T. Dunn, B.A., F.L.S. 402

Alabastra Diversa.—Part XV. By Spencer le M. Moore, B.Sc., F.L.S. (continued). 404

Dr. St. Brody's Work in Gloucestershire. By James W. White, F.L.S. 407

Report of Department of Botany, British Museum, 1906. By A. B. Rendle, D.Sc., F.L.S. . 408

PAGE

Short Notes. — *Linaria arenaria* DC. in England. — *Colchicum variegatum* L.—Phyllody of the Calyx in *Myosotis palustris*.—A Proposed Exchange Club for Lichens. — *Juncus pygmæus* Thuill. in Cyprus?—*Limonium recurvum* C. E. Salmon.– *Sagina Reuteri* Boiss. — *Vicia bithynica* L. — *Lachnea hirto-coccinea* Phill. & Plow. 411

Notices of Books:—

The Flora of Glamorgan. Edited by A. H. Trow, D.Sc., F.L.S. 413

The Principles of Horticulture. By Wilfred Mark Webb, F.L.S. 415

Book-Notes, News, &c. 416

Supplement. — A Flora of Glamorganshire. By H. J. Riddelsdell, M.A. (concluded).

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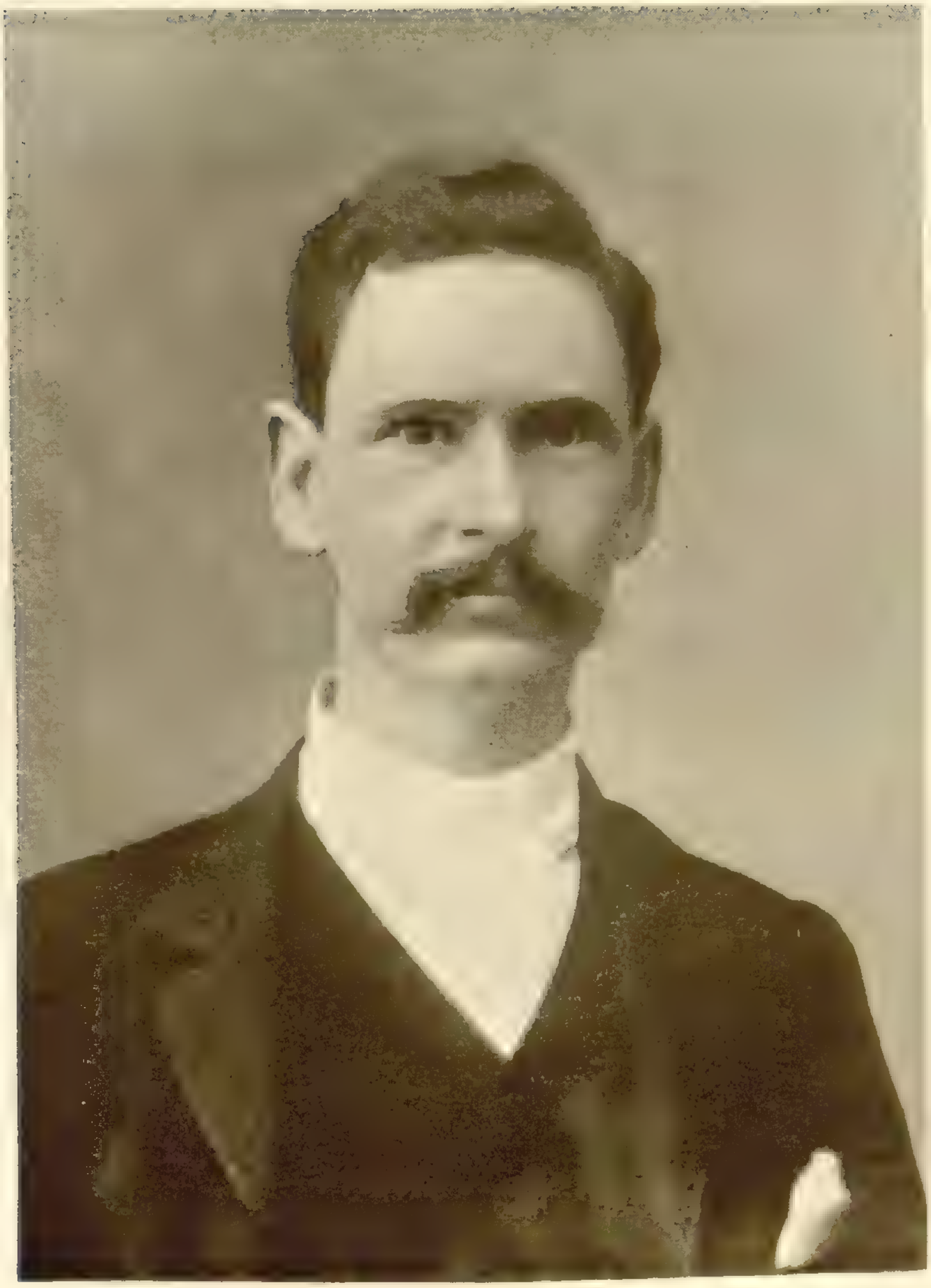

Edward Bellamy

EDWARD ARTHUR LIONEL BATTERS.
(1860–1907.)

(WITH PORTRAIT.)

THE brief paragraph in the September number announcing the sudden death of Mr. Edward Arthur Lionel Batters must have come as a painful shock to readers of this Journal. All who had the privilege of knowing him personally, of associating with him in the collection of marine algæ, or of hearing his views upon questions of systematic distinction, must have felt that he was in the prime of his mental and bodily capacities, and had still many years of work and happiness before him. Stricken unsuspectedly with an attack of blood-poisoning which rapidly developed, he succumbed in three days, even before the danger of the case was recognized.

Born on December 26th, 1860, Mr. Batters was the fifth son of Mr. George Batters, of Enfield. He was educated at King's College School, London, and Trinity Hall, Cambridge, where he studied law; he proceeded to the degrees of B.A. and LL.B., and was called to the Bar at Lincoln's Inn. But having no taste for the career of a barrister, and not being dependent upon his profession, he abandoned law and devoted himself largely to the study of British marine algæ. Natural History had indeed always attracted him even in his earliest years, as may be seen from the following extract from a letter written by his aunt, a resident of Berwick-on-Tweed:—"He was only seven years old when his mother died. In those early years before her death she spent many summers with us [at Berwick]. Her favourite haunt was by the seaside, gathering seaweeds and fossils. And when too young to pronounce long names, he would often find fossils and know them by their indentations. He first gained his love for seaweeds from his mother. And he began in earnest when very young, on being given Mrs. Gatty's book, to search the shore and cave-pools for specimens. As his father was a self-taught geologist, so he was equally a self-taught algologist. His knowledge was intuitive. He had no help from anyone." Before entering Cambridge University he spent two or three years with a coach at Berwick-on-Tweed, thus enjoying unusual facilities for continuing his study of algæ. Shortly after this he made the acquaintance of Mr. E. M. Holmes, who has supplied the following information to the editor:—"The only man who knows Batters's early days better than I do is Mr. R. I. Lynch, Curator, Botanic Garden, Cambridge. It was through him that I made Batters's acquaintance. Batters went to stay with his aunt at Berwick-on-Tweed, and there picked up a floating seaweed (*Dasya Muelleri*, if I remember rightly). He tried to identify it at Cambridge, and, getting no help from the botanical staff there, applied to Mr. Lynch, who told him: 'If anyone can help you, it is Mr. Holmes.' Lynch knew me at Plymouth as an algologist before he went to Cambridge. I was able to identify it; and there sprang up an

acquaintance and friendship between us. Batters was not married at the time when I identified the *Dasya*, being a student at Cambridge. I stayed three days at Berwick with him when his aunt was away, and showed him *Codiolum* and *Cladophora arctiuscula* growing there, and *Dictyosiphon mesogloia* on the road to Holy Island, where we went (four miles across the mud) to get *Mertensia maritima*, and where I found *Carex incurva*. Every seaweed that he had not got I gave him a duplicate of if I had one, and gave him the names and addresses of all my correspondents. I introduced him to Buffham, who in the first place came to me to know what remained to be done in the microscopic examination of algæ. I told Buffham that the reproductive organs of several species were not known, indicating the groups and species. This work he did well, being a first-class microscopist. Indeed, he taught Batters what he knew of microscopic work, and helped him to choose his lenses. I also indicated to Batters, and to Traill before I knew Batters, the plants that should be looked for in the north, and many of these they found. Batters, having a keen eye and being an excellent draughtsman (he comes of an artistic family), found also several new species and described them. Concerning them I gave him what help I could, and when I could not determine what they were, being too busy teaching Materia Medica, &c., I told him to whom to send them."

The first important paper published by Mr. Batters was his "List of the Marine Algæ of Berwick-on-Tweed" (*Trans. Berwickshire Naturalists' Club*, 1889, 171 pp., 5 plates), in which he revealed to the public for the first time what a remarkable knowledge he had already acquired of marine algæ. He tells us that for several years he had visited Berwick at all seasons for the purpose of collecting, and that with very few exceptions he had himself gathered every species recorded in the list. The excellent plan of the book shows the author's capacity for marshalling his facts, and the critical notes are evidence of his powers of observation.

In 1890 he collaborated with Mr. Holmes in the production of a "Revised List of the British Marine Algæ" (*Annals of Botany*, v. pp. 63–107). This was a check-list with the distribution of the species broadly indicated; and in it a new classification was adopted more in accordance with the advance of knowledge, Mr. Batters taking the *Cyanophyceæ* and *Phæophyceæ*, and Mr. Holmes the *Chlorophyceæ* and *Rhodophyceæ*.

His first contribution to the *Journal of Botany* was a "Hand-list of the Algæ of the Clyde Sea Area" (1891, pp. 212–214; 229–236; 274–283, with map), compiled at a time when there was considerable activity in the biological research of this region. In the years that followed he contributed to the Journal a number of short papers treating of new or critical British algæ, among the novelties there described being the following genera new to science:—*Gonimophyllum*, *Colaconema*, *Trailliella*, *Porphyrodiscus*, *Neevea*, *Rhodophysema*, *Erythrodermis*. Another new genus, *Conchocelis*, a perforating alga, was described in the *Phycological*

Memoirs, pt. i. (1892) pp. 25–28; and yet another, *Schmitziella*, an endophytic alga of the order *Corallinaceæ*, in the *Annals of Botany*, vi. (1892) pp. 185–194.

In 1892 he gave his aid to Mr. Massee in editing *Grevillea*, taking charge of the portion devoted to algæ, and contributing to each number a systematic paper and most of the biographical notices. That periodical came to an end in 1894, in which year Mr. Batters published a "Provisional List of the Marine Algæ of Essex" in the *Essex Naturalist*, and a paper "On *Acrosiphonia Traillii*, a new British Alga," in *Trans. Bot. Soc. Edinburgh.*

His most important contribution to algology was the "Catalogue of the British Marine Algæ," which was issued as a Supplement to this Journal in 1902. It is a list of all the species of seaweeds known to occur on the shores of the British Islands, with the localities where they are found. This is the most exhaustive exposition of the systematic arrangement and of the local distribution of the British marine algæ that has yet been published, and was the framework on which he intended to build the much-needed handbook which we all anxiously awaited from him, and which he was so eminently competent to produce. It was indeed currently supposed that his manuscript for this was almost ready for press. But a thorough search has clearly shown that nothing more than a fragmentary beginning of the work was made. Possessed of an unfailing memory, he was easily able to store in his mind all that wealth of facts and details which he so willingly put at the disposal of those who questioned him. This wonderful knowledge, save in so far as it is roughly recorded in his field note-books, is all lost.

His herbarium is estimated to contain upwards of 10,000 British and 3000 exotic specimens, and includes the collections of Mrs. Mary P. Merrifield and of the Rev. John Hutton Pollexfen, M.D. An obituary notice of the latter was contributed by Mr. Batters to this Journal in 1899 (pp. 438, 439). He also possessed more than 3000 microscope-slides. These, with his herbarium and manuscripts, are now lodged in the British Museum with a view to their acquisition.

Mr. Batters possessed great powers of organization. A few years ago the affairs of a coal-mine in which he was interested were left in a state of confusion on the sudden death of the chairman. Mr. Batters was appointed to the vacant chair, though knowing nothing of the working of the mine. In a few months he had obtained a complete mastery of all the details, and soon succeeded in putting the whole business into such excellent working order as to astonish and delight the grey-beards on the board of directors.

As mentioned above, Mr. Batters inherited artistic ability, which he manifested in various ways; for instance, he recently executed some admirable wood-carving from his own designs, though uninstructed in the art.

Both as a friend and as a botanist he will be sorely missed. His kindly, modest, unselfish nature made him beloved by every-

one with whom he came in contact. In his particular branch of botany his loss is quite irreparable. Such a good systematist and collector is a rare treasure nowadays. The knowledge which he possessed is not to be learned from books or classes, and demands both natural aptitude and years of observation and study.

His name is commemorated in the genus *Battersia* founded by Reinke in 1890 (*Ber. deutsch. bot. Ges.* viii. p. 205) upon a *Ralfsia*-like brown alga of the family *Sphacelariaceæ* collected near Berwick.

A. & E. S. Gepp.

NOTES UPON HIND'S *FLORA OF SUFFOLK.*

By C. E. Salmon, F.L.S.

Whilst preparing an article upon the flowering plants of Suffolk for the Victorian History of the county, it seemed a suitable time to take advantage of Dr. Hind's suggestion in the preface to his *Flora*:—"Whilst the *Flora* has been in progress, a Herbarium of Suffolk has also been in course of preparation. . . . As it is to be placed in the Ipswich Museum . . . it will be available for future students of Suffolk Botany; and it will serve as a test of the correctness, or the contrary, of the genera and species as set forth in this work." By the kind permission of the Museum authorities I was allowed to examine the Herbarium at Ipswich, and to borrow many of the more critical forms for careful study.

The notes which follow show the result of this examination, and must be compared side by side with the *Flora*; particular note must be taken that the comments refer only to the plants from the localities cited and not to the species generally.

The opportunity has been taken to add a few records (distinguished by an asterisk) which appear to be new to their respective divisions of the *Flora*: all the other plants may be found in the Ipswich Museum.

I wish to thank, for much critical help, Messrs. A. Bennett, J. Groves (*Ranunculus*, *Characeæ*, &c.), Rev. E. F. Linton (*Rosa*, *Salix*, &c.), Rev. E. S. Marshall (*Carex*, &c.), and Rev. W. Moyle Rogers (*Rubus*).

27–31.† *Ranunculus confusus* Godr. 5. Felixstowe = *Baudotii*. Form *R. salsuginosus* Hiern. 5. Walton. Specimen incomplete, probably *R. heterophyllus* Web. var. *submersus* (Hiern). — *R. Baudotii* Godr. *3. Southwold, 1896! Form *R. marinus* Fries. 3. Benacre = a late state of *R. Baudotii* Godr. — *R. penicillatus* Hiern. Form *R. pseudo-fluitans* Hiern. 1. Mildenhall = *R. peltatus* Schrank var. *penicillatus* (Hiern). — *R. Flammula* L. Form *R. pseudo-reptans* Syme. 1. Thetford Warren. Not this variety. —*R. acris* L. var. *R. tomophyllus* Jord. 1. Wangford = *Boræanus* Jord.

42. *Fumaria confusa* Jord. 3. Bradwell. Hopton = *F. offici-*

† The prefixed numbers refer to the pages in Hind's *Flora*.

nalis.—*F. muralis* Sond. 1. Fakenham = shade-grown *F. officinalis*.—*F. Vaillantii* Lois. 1. Edge of heath, Wangford = *F. parviflora* Lam.

45. *Barbarea stricta* Andrz. 1. Thurston. A form of *B. vulgaris* which approaches *B. stricta* in some features, but will not match Kew or York examples of the true small-flowered plant.—*B. intermedia* Bor. 2. Nayland = *B. præcox* R. Br.

55. *Diplotaxis muralis* DC. b. *D. Babingtonii* Syme. *3. Southwold, 1896!

56. *Alyssum calycinum* L. *3. Easton Bavents, 1896!

58. *Armoracia amphibia* Koch. *2. Stour at Cavendish, 1876, *W. Whitwell.*

68. *Viola lutea* Huds. 1. Barnham Heath. Does not seem to be *lutea*, but one of the *tricolor* group nearest *carpatica* Borbas.

69. *Drosera intermedia* Hayne. 4. Redgrave. Not *D. intermedia*, but the hybrid **D. obovata* M. & K., which seems previously unrecorded for Suffolk. The parents, *D. anglica* and *rotundifolia*, grow with it here.

71. *Polygala vulgaris* L. var. *P. depressa* Wender. 2. Thurlow. Specimen poor; probably *vulgaris*.

81. *Stellaria media* Vill. c. *S. neglecta* Weihe. 1. Hopton = *S. umbrosa* Opiz.

90. *Tilia grandifolia* Ehrh. *2. Lavenham, *G. C. Druce.*

91. *Hypericum dubium* Leers. 4. Botesdale = *H. quadratum* Stokes.

95. *Geranium pratense* L. 1. Livermere. On the label is written, "Possibly introduced."

100. *Oxalis corniculata* L. (*stricta* Auct.). *2. Wild in a shrubbery, Nayland! 1893, *J. D. Gray.*

123. *Lathyrus palustris* L. 1. Near Euston Bridge (? Norf. or Suff.). Mr. Bennett tells me that this locality is in Norfolk.

129. *Alchemilla vulgaris* L. 2. Cockfield. Is the segregate *A. filicaulis* Buser.

133–141. *Rubus plicatus* W. & N. 3. Fritton. Specimen imperfect, but not *plicatus*.—*R. nitidus* W. & N. 3. Gorleston = *R. affinis* W. & N.—*R. affinis* W. & N. 3. Hopton = *R. Selmeri* Lindeb. = *affinis* Blox. non W. & N.—*R. leucostachys* Sm. var. *R. conspicuus* P. J. Müll. 1. Sapiston. Type, not the variety.—*R. Salteri* Bab. 2. Wiston. Material unsatisfactory, but the panicle is clearly that of *Lindleianus*.—*R. Salteri* Bab. var. *R. calvatus* Blox. 3. Fritton = *R. pyramidalis* Kalt.—*R. carpinifolius* W. & N. 1. Honington = *R. pulcherrimus* Neum.—*R. villicaulis* W. & N. 1. Honington = *R. leucostachys* Schleich.—*R. Maasii* Focke. 3. Henstead. Example too imperfect to name.—*R. macrophyllus* W. & N. 1. Troston = *R. pulcherrimus* Neum. Risby Heath, in a grove. This is apparently *R. corylifolius* Sm.—*R. macrophyllus* W. & N. var. *R. glabratus* Bab. 1. Fakenham. Apparently *R. pulcherrimus* Neum.—*R. rubicolor* Blox. 4. Mellis. Could not be named by Rev. W. Moyle Rogers.—*R. thyrsiflorus* W. & N. 1. Honington. This belongs to *Cæsii*.—*R. rosaceus* W. & N. 1. Fakenham Wood. This and the plant from same

locality under *R. Hystrix* Weihe = subsp. *infecundus* Rogers. —*R. rudis* Focke. 4. Mellis. Probably *R. dumetorum* W. & N. —*R. Radula* Weihe. 2. Wiston = *R. dumetorum* W. & N.—*R. Koehleri* Weihe var. *R. pallidus* Weihe. 1. Troston. This and the plant from Honington under var. *cavatifolius* P. J. Müll. = *R. dumetorum* W. & N.—*R. fusco-ater* Weihe ? 1. Ixworth Thorpe = *R. dumetorum* W. & N.—*R. diversifolius* Lindl. 1. Honington = a *dumetorum* form; the "*R. mutabilis* Genev." from the same locality is also *R. dumetorum*.—*R. Lejeunii* Weihe. 1. Troston. Very doubtful; nearer *diversifolius* than *Lejeunii*.—*R. saxicolus* P. J. Müll. 2. Wiston. Apparently = *dasyphyllus* Rogers.—*R. pendulinus* Müll. 2. Polstead Marsh. = *R. foliosus* W. & N.—*R. Balfourianus* Blox. 1. Honington. Seemingly *R. corylifolius*; the example from 4. Dunwich is too imperfect to name with certainty.—*R. corylifolius* Sm. *a R. sublustris* Lees. 4. Dunwich. Too imperfect to name.—*R. corylifolius* Sm. c. *R. fasciculatus* P. J. Müll. 1. Honington = *R. dumetorum* W. & N.—*R. deltoideus* P. J. Müll. 1. Troston. This specimen is probably a hybrid.—*R. scabrosus* P. J. Müll. 1. Euston. The panicle of this example seems to be *R. leucostachys*.—*R. cæsius* L. *a R. umbrosus* Bab. 1. Fakenham Wood. A cæsian hybrid, as also is the *β R. tenuis* Bell Salt from 1. Troston.—c. *R. ligerinus* Genev. 1. Fakenham = ordinary *R. cæsius*; the example from Sapiston Grove is very doubtful.—d. *R. intermedius* Bab. 1. Fakenham and e. *R. Pseudo-idæus* Lej. 4. South-east of Redgrave Fen are both extremely doubtful as the specimens are very poor.

143–146. *Rosa tomentosa* Sm. var. *R. scabriuscula* Sm. The specimens from 1. Ixworth Thorpe and 4. Westleton, are doubtful. —*R. micrantha* Sm. The 2. Nayland and 3. Hopton examples both = *R. rubiginosa* L.—*R. canina* L. f. *R. biserrata* Merat. 1. Ixworth Thorpe. More likely *dumalis* Bechst.—h. *R. frondosa* Steven. 1. Ixworth Thorpe = *lutetiana* Leman.—j. *R. dumetorum* Thuill. 1. Coney Weston = *urbica* Leman.—k. *R. obtusifolia* Desv. 4. Burgate. Nearer *frondosa* Stev.—p. *R. verticillacantha* Merat. 2. Nayland and Wiston. A form with smaller, rounder, and less glandular fruits.—u. *R. decipiens* Dum. The 2. Wiston plant is doubtful.—*f. *R. marginata* Wallr. 1. Market Weston. Seems doubtful, perhaps *Blondæana* or *scabrata*.—*R. stylosa* Desv. c. *R. leucochroa* Desv. 2. Polstead. No; but the Rev. E. F. Linton has found it at 2. Wiston (*fide* Crépin).—*R. arvensis* Huds. c. *R. bibracteata* Bast. Had better be omitted from the Suffolk list; the Honington plant is *R. arvensis* only.

151. *Epilobium parviflorum* Schreb. form c. *E. intermedium* Merat. 4. Redgrave Fen. *E. parviflorum* only; *E. intermedium* Merat, is a hybrid.

156. *Herniaria glabra* L. var. **subciliata* Bab. 1. Kentford Heath! 1903, *A. Wallis*.

158. *Sedum Fabaria* Koch. 1. Cross Wood, Wattisfield. Specimen very poor and apparently only *S. Telephium* L.

165. *Apium nodiflorum* Reichb. b. *A. repens* Reichb. 1. Wangford. Close to var. *pseudo-repens* H. C. Wats.

170. *Œnanthe pimpinelloides* L. Safer to omit this at present as a Suffolk species: the Tuddenham Bog plant is *Œ. Lachenalii*. —*Œ. silaifolia* Bieb.? Rightly named; see Garry, *Journ. Bot. Supp.* 1903, p. 85.

187. *Galium Mollugo* L. c. *G. Bakeri* Syme. 4. Between Yaxley and Scole. 5. Claydon. Neither will do for var. *Bakeri*.

189. *Valeriana officinalis* L. b. *V. Sambucifolia* Mikan. 1. Ixworth Thorpe = *V. Mikanii* Syme.

190. *Valerianella carinata* Loisel. 2. Nayland = *V. olitoria*.

194. *Aster Novi-Belgii* L. The Redgrave Fen plant is *A. salignus* Willd.

211. *Arctium nemorosum* Lej. 1. Fakenham Wood = a *minus* form.—*A. intermedium* Lange. 1. The examples from Fakenham, Stanton, and Troston are all *A. minus*.

225. *Crepis taraxacifolia* Thuil. 1. Rougham = *C. setosa* Hall. fil.

226. *Hieracium murorum* L. 1. Near Bury = *H. pellucidum* Laestad. var. *lucidulum* Ley. — *H. vulgatum* Fr. 1. Sapiston Grove=**H. sciaphilum* Uechtr.

235. *Erythræa littoralis* Fr. 1. Brandon and between Wangford and Lakenheath. Specimens from these localities do not agree with *E. littoralis* (which is rare in southern England), and are better placed as narrow-leaved forms of *E. Centaurium*; see *Bot. Rec. Club Rep.* for 1883, p. 43.

256. *Scrophularia umbrosa* Dum. 1. Hinderclay Wood. This should be gathered again before being definitely included in the *Suffolk Flora*; the specimen preserved is very immature and unsatisfactory, so much so that one well-known botanist hesitated to place it under *Scrophularia* at all!

259. *Euphrasia officinalis* L. b. *E. nemorosa* H. Mart. *1. Brandon and Hopton Fen! *W. M. Hind.*

264-267. *Mentha alopecuroides* Hull. *2. Between Bures and Sudbury = *M. rotundifolia* L.—*M. aquatica* L. var. *M. subglabra* Baker. 4. Redgrave Fen. Too hairy for this variety.—*M. pubescens* Willd. 4. Mellis = *M. hirsuta* var. *subglabra* Baker. — *M. pubescens* Willd. var. *M. hircina* Hull. 1. Lakenheath. A form of *M. hirsuta* approaching var. *subglabra*. —*M. sativa* L. var. *M. subglabra* Baker. 1. Mildenhall. No, far too hairy.—*M. arvensis* L. var. *M. Nummularia* Schreb. 1. Troston. 4. Redgrave.—Var. *M. agrestis* Sole. 4. Botesdale. — Var. *M. præcox* Sole. 1. Fakenham. All the above seem incorrectly named.

269. *Calamintha Nepeta* Clairv. *2. Stoke by Nayland! 1880, *W. M. Hind.*

275. *Galeopsis dubia* Leers. Exceeding doubtful as a Suffolk species if only based upon the record in *Phytol.* N. S. vi. 368 (1862) (q. v.).

280. *Utricularia neglecta* Lehm. 3. Kessingland and Belton = *U. vulgaris*.

287. *Statice Limonium* L. 5. Chelmondiston. Good specimens of *L. Neumani* (= *S. Limonium* × *bahusiensis*) occurred

amongst the examples from this locality, which also produces true *bahusiensis*.

288. *Plantago Coronopus* L. The Southwold "*P. multispicata*" is merely a monstrous form. — *P. major* L. The panicled form from Worlingham is also a monstrosity.

295. *Salicornia herbacea* L. 5. Stutton = **S. stricta* Dum.— *S. herbacea* L. b. *S. procumbens* Sm. 3. Breydon Water. 5. Chelmondiston and Aldeburgh. All three = **S. appressa* Dum.

296. *Atriplex deltoidea* Bab. 1. Fakenham. 5. Stutton = *A. hastata* L.

304. *Polygonum Raii* Bab. 5. Landguard Fort. A likely enough spot for this, but the plant preserved is only *P. aviculare* L. var. *agrestinum* Jord. Unless known elsewhere in the county, the record for Suffolk must disappear.

305. *Daphne Mezereum* L. 1. Hawstead. A mistake; this locality should stand for the next species, *D. Laureola*.

397. *Asarum europæum* L. 4. Wortham. The specimen is labelled "cult."

311. *Callitriche obtusangula* Le Gal. 1. Mildenhall = *C. hamulata*. *2. Sudbury, *G. C. Druce*. — *C. hamulata* Kütz. b. *C. pedunculata* DC. 1. Thetford Warren = *C. hamulata*.

314–317. *Salix fragilis* L. a *S. decipiens* Hoffm. 3. Gorleston = f. *britannica* F. B. White.—*S. fragilis* L. c. *S. Russelliana* Sm. 1. Hinderclay = *fragilis* type.—*S. triandra* L. 1. Thelnetham = var. *Hoffmanniana*. — *S. viminalis* L. b. *S. intricata* Leefe and c. *S. stipularis* Leefe, both from 1. Knettishall = *viminalis* type.

329. *Orchis latifolia* L. 1. Hopton = *O. maculata* L.—*O. incarnata* L. 1. The specimens from Hopton Fen, Bardwell, and Sapiston are all *latifolia*; the one from Thelnetham is *O. incarnata* auct. brit. non L. — *O. incarnata* L. b. *O. angustifolia* Bab. 1. Hopton Fen = *O. maculata*.

336. *Epipactis latifolia* All. 1. Fakenham. Better placed under *E. media* Fr.

364. *Ruppia maritima* L. 5. Walton. Seems much nearer *R. rostellata*.

372–384. *Carex divisa* Huds. *3. Southwold, 1896! — *C. muricata* L. var. *pseudo-divulsa* Syme. 1. Sapiston Grove = *C. divulsa* Good. — *C. stricta* Good. 1. Tuddenham = *C. acuta* L. — *C. acuta* L. 1. Ixworth Thorpe = *C. stricta* Good. *2. Nayland, *J. D. Gray*. — *C. flava* L. 1. The specimens from Hopton Fen and Tuddenham are apparently strong examples of *C. Œderi* Retz var. *œdocarpa* And. — *C. flava* L. var. *C. minor* Towns. 1. Lakenheath. Type *C. Œderi* Retz. The a–e states of *minor* gathered at Lakenheath are all forms of type *Œderi* Retz. —*C. Œderi* Ehrh.? 3. Lound. Looks like drawn-up *C. Œderi* Retz var. *œdocarpa* And.—*C. Hornschuchiana* Hoppe. 1. Mildenhall = the sterile hybrid *C. Hornschuchiana* × *Œderi* var. *œdocarpa* (= probably *C. fulva* Good.).—*C. punctata* Gaud. 4. Dunwich = *C. distans* L.; so the species must disappear from Suffolk lists. Not infrequently forms of *distans* are gathered and reported as *punctata*, but the latter, with its pale inflated patent fruits, when

once seen fresh can never after be mistaken. — *C. hirta* L. *3. Roadside near Blyford, 1896! — The *Carex* from Weston Fen appears to be young *C. rostrata*, and not a hybrid.

410. *Serrafalcus mollis* Parl. b. *S. glabrescens* Coss. *4. Dunwich, 1896!

411. *Triticum repens* L. var. *barbatum*. *4. Walberswick, 1896!

419. *Lastrea æmula* Brack. 3. In a copse at Lound. Cannot pass as this species, which therefore must be rejected for the present as a Suffolk plant.

426–428. *Chara fragilis* Desv. d. *C. Hedwigii* Kuetz. 1. Suffolk W. The precise locality is Coney Weston Fen.—*C. aspera* Willd. 4. Redgrave Fen. The specimen so named is a mixture of *polyacantha* and *hispida*, but the Fen also produces *C. aspera*!—*C. contraria* Kuetz. 1. Lakenheath? The specimen is *C. hispida*, but Mr. Hind found true *C. contraria* at Livermere in 1885.—*C. vulgaris* L. b. *C. longibracteata* Kuetz. 1. Livermere. The specimen so named is *C. hispida*, but var. *longibracteata* has also occurred in this locality. — *C. vulgaris* L. c. *C. papillata* Wallr. 1. Thelnetham. The specimen is merely a mixture of *vulgaris* and *hispida*.

429. *Nitella opaca* Agardh. 2. Suffolk East. The precise locality is Hopton, near Yarmouth.

A NATURAL *BERBERIS*-HYBRID IN ENGLAND.

By Rev. E. S. Marshall, M.A., F.L.S.

On September 23rd, 1907, I found a very large Barberry-shrub, extending for about twenty feet and fully ten feet high, in the hedgerow of a narrow, unfrequented lane, midway between the hamlet of Bossington and Hurlstone Point, v.-c. 5 S. Somerset. Its general appearance is that of a very fine *B. vulgaris*, and I should probably have passed it by, but for the very different fruit. A brief examination of the characters convinced me that it was a hybrid between the common Barberry and the shrubbery plant of our gardens, *B. aquifolium*; and this determination is fully borne out by comparison with the parents, which I happen to have growing. *B. vulgaris* occurs in a wood above Bossington, as well as in several hedges about Allerford and Selworthy, and I think it probably native. *B. aquifolium* is occasionally planted as cover for game, and may have been thus introduced on the Acland property. I believe that *B. vulgaris* is the female parent; the agency both of insects and birds must, I think, have contributed to its production, as the locality is about half a mile from the nearest house.

B. aquifolium × vulgaris.—Bark grey-brown on the older, yellowish on the younger, wood. Thorns mostly in groups of three, as in *vulgaris*, but as a rule shorter, seldom exceeding ¾ in. Leaves simple, rather light green, sessile or shortly stalked

(dark shining green in *aquifolium*, about 6 in. long, with usually three pairs of leaflets besides the terminal one), 1 to 2 in. long and up to 1 in. broad, coriaceous and probably evergreen, glabrous; veins very numerous, strong, prominent above when dry; subentire and smaller upwards on the young shoots, more or less distinctly prickle-toothed (holly-like) and occasionally laciniate lower down, and on the older branches. Fruit abundantly produced, varying from round to oval, bright red when half ripe, ultimately almost black, with abundant glaucous bloom and dark crimson juice; style distinct, stout, crowned by the broader stigma. Racemes rather short, $1\frac{1}{4}$ to $1\frac{3}{4}$ in. long (about 1 in. in *vulgaris*, about $2\frac{1}{2}$ in *aquifolium*, which is similar in the shape and colour of the fruit, but has the sessile stigma depressed when ripe). *Seeds apparently perfect.*

It is curious that this plant should so strongly incline towards one species in habit, armature, and simple foliage, and to the other in fruit. Dr. Focke's remarks (*Pflanzenmischlinge*, p. 22) are so interesting that I translate them in full:—

"MAHONIA.

"Several closely related species (*B. aquifolium* Pursh., *B. fascicularis* Lindl., *B. nervosa* Pursh., and *B. repens* Lindl.) have been introduced from North America into European gardens. The genuine types are fairly well characterized, and can be distinguished without much difficulty; but in European gardens they have merged through manifold crossings into one extremely variable, but in all its forms fully fertile, 'mixed species' (Mischart). The first hybrid of the kind, a *B. aquifolium* × *fascicularis*, was already distributed by Rivers, the nurseryman, before 1850. For example, about 1855 my father planted a number of Mahonias from England. As they throve better in the dry sand of his garden than any other cultivated plants, he sowed the seeds of different kinds separately, but obtained from each sowing a variety of forms, which it seemed quite hopeless to keep apart. Since then these shrubs have increased remarkably by self-sowing; all the specimens are very fertile, but one can with difficulty find two bushes among them which exactly resemble each other.

"MAHONIA × EUBERBERIS.

"*Berb. vulgaris* L. var. *atropurpurea* hort. × *aquifolium* Pursh. was of accidental origin in A. N. Baumann's garden at Bollweiler, in Alsace, and was introduced into horticulture under the name of *B. Neuberti*. It is more like *B. vulgaris*, but is evergreen and has prickly leaves."

The Somerset plant appears to be the first known instance of a quasi-wild hybrid in the genus. My garden shrub agrees well with the description of true *B. aquifolium* Pursh., and has none of the characters of *B. fascicularis* or *B. nervosa*.

NOTES ON THE FLORA OF THE CHANNEL ISLANDS.

By G. Claridge Druce, M.A., F.L.S.

In June and July of the sunny year 1906 I revisited the Channel Isles after an absence of twenty-nine years. The prolonged drought had burned up the annuals and small *Leguminosæ*, but still much of interest was left, even on the dry sand-dunes of St. Ouen's in Jersey, of L'Ancresse, Guernsey, or Longy Bay in Alderney. Naturally the intervening years had left their mark on the places visited; St. Aubin's Bay, which in 1877 had some considerable area of aboriginal soil, has now to a great extent been built upon, the marshes drained, and a sea-wall built, much to the detriment of many local species, and to the actual extirpation of *Ranunculus ophioglossifolius*, while the existence of *Allium sphærocephalon* in its only locality in the islands is imminently threatened. At St. Ouen's the apparently useless sea-wall has destroyed the locality for *Diotis*, and the golfers in their wild and wandering course do an unnecessary amount of damage. Building operations at St. Aubin's and St. Helier's have exercised their usual malevolent influence. Still, the wide expanse of sand-dunes at St. Ouen's remains much as it was, so far as its natural conditions go, but the spread of *Statice plantaginea*, *Brassica Cheiranthus*, and especially of the introduced *Lagurus*, is very remarkable. The Cape of Good Hope *Gnaphalium undulatum* has come to stay, and before a decade has passed *Senecio Cineraria* will doubtless have become established. *Œnothera odorata* has much extended its range in the island, and the profusion of *Kentranthus ruber* in three tints of colour is a prominent feature at St. Helier's.

In Guernsey, especially on the eastern side, there has been a much greater change, the extensive granite quarries have transformed the face of the earth; the destruction of the old salt-pans at St. Sampson's is complete, the site being now occupied by glass-houses or other buildings, and *Suæda fruticosa* and *Polypogon monspeliense*, which I once gathered there, are now extinct. The marshes of the Grande Mare have become much smaller by drainage, and what is left is less rich than formerly, the local species—*Spiranthes æstivalis*, *Pyrola rotundifolia*, and *Carex punctata*—being now quite rare. The golfers have settled upon L'Ancresse, and over the whole island there has been a great eruption of habitations and glass-houses. To make up for plant diminution *Allium Ampeloprasum* appears to be now more frequent near St. Peter's, and *Erigeron mucronatum*, *Gunnera chilensis*, and *Trachelium cæruleum* are now established aliens.

The two excellent local floras—that of Jersey, by Mr. Lester-Garland, and the very comprehensive work on Guernsey and the adjacent islands by Mr. E. D. Marquand—deal very thoroughly and scientifically with the flora.

Notwithstanding the havoc which the spread of population and increasing attention to cultivation has caused, these islands

are still most interesting botanical ground, and the peculiarities of plant distribution are again and again brought to one's notice. Why should there be no *Medicago* of any kind or *Geranium Robertianum* in Sark? Why has Jersey no *Caltha*, *Isoetes hystrix*, *Ophioglossum lusitanicum*, *Briza media*, *Rubus idæus*, *Prunus insititia*, or *Senecio aquaticus*? and why should Jersey have *Nardus*, *Corynephorus*, *Carex binervis*, *Papaver Argemone*, *Geranium lucidum*, and many other species which are absent from Guernsey? More puzzling still is the flora of that small islet Burhou, near Alderney, which from the distance looks covered with verdure, and yet possesses not a species of grass, the green colouring being due to *Pteris* and *Spergularia rupestris*. Nor is there a single Composite, although there is a small patch of *Scirpus maritimus*, which does not occur on the adjacent island of Alderney. The absence of aboriginal woodland in the islands accounts for the non-existence of such sylvan species as *Oxalis Acetosella*, &c.

The glory of the Jersey flora is the masses of colour produced by that eminently Mediterranean species *Echium plantagineum*, by the beautifully contrasted foliage and blossom of *Brassica Cheiranthus*, by the pale gold of *Raphanus maritimus*, or the artistic tints of *Mathiola sinuata*. Then there are the lilac-pink flowers of *Statice plantaginea*, the pale pink of *Tunica prolifera*, the rich dark rose of the fragrant *Dianthus gallicus*, the patches of straggling foliage and pale-red flowers of *Centaurea aspera*, and the down-like panicles of the introduced *Lagurus ovatus*. In Guernsey, the shady lanes lined with ferns, the hedges and waysides here and there adorned with the beautiful *Fumaria capreolata* or *speciosa*, and more abundantly by the luxuriant *F. Borœi*, and the beautiful growth of *Agropyron junceum* and its hybrids on the coast are characteristic features. In Alderney, the rich profusion of *Brassica incana*, which impressed Babington on his visit, is still a great feature, nor less remarkable are the enormous spikes of *Orobanche amethystea* growing on the glaucous *Eryngium*; the rank abundance of *Salvia Verbenaca* is also a characteristic feature, while the occurrence of *Orchis pyramidalis* and *Arabis hirsuta* on the sand-dunes testifies to the large percentage of calcareous shell-*débris* which the soil contains. Nor must the beautiful patch of the rare *Limonium lychnidifolium* remain unnoticed, and the blue-flowered *Orobanche purpurea*, the rich bright rosy flowers of *Ononis reclinata*, and the clean-cut foliage of *Bupleurum aristatum* delight the botanist's eye.

To visit Sark after Alderney is like going from Kent to North Wales; the plants appear to flower about ten days later, while the difference in the species is very marked. The high cliffs surrounding Sark appear to have been an effectual barrier to the introduction of many species, and the absence of mobile sands necessarily limits the variety of the flora. While admitting there is great similarity as a whole between the flora of these islands with that of the adjoining French coast, it is the difference rather than the likeness which strikes one. This perhaps not so much in the relative occurrence of various species as in variations of

the same species. There is more than one would at first suspect that recalls the flora of South Devon and Cornwall. There is also the interesting evidence of a Peninsular, and indeed of a Mediterranean, element; as Mr. Lester-Garland says: "It was to be expected, *a priori*, that the mildness of the maritime climate of Western Europe would enable some of the southern plants to advance much further north than is possible in the interior of the Continent, and experience has proved that this expectation has been justified." He enumerated twenty-six species "whose proper home is on the shores of the Mediterranean and which straggle up the west coast of France, becoming rarer as they advance towards the north." Of these Mediterranean species, fourteen are not found in Britain. To those enumerated I am now enabled to add three species, two of which are almost certainly native elements of the island flora—*Spergularia atheniensis*, which has a wide range along the Mediterranean coast, and *Orobanche Ritro* var. *hypochæroides*, the type of which is limited to a few localities north of Marseilles, but here exists as an endemic variety on a different host-plant. *Agrostis verticillacantha*, which is abundant in Guernsey, may not be native, since it is said to be introduced in its only known station in north-western France in the environs of Cherbourg, but further research may establish its claims to a higher grade of citizenship. Besides these distinct species, we have a well-marked modification of *Picris hieracioides* in Alderney, of *Leontodon nudicaulis* in Guernsey and Alderney, of *Vicia angustifolia* in Jersey, and of *Spergula arvensis* in Guernsey, Jersey, and probably Alderney. Nor must the peculiar *Salvia*, which I have named *Marquandii*, from Guernsey be forgotten in this enumeration of the more striking features of the Channel Island Flora.

One of the joys of my visits (for since I wrote the foregoing I have, in the spring of 1907, again been to the islands in order to see *Ophioglossum lusitanicum* and *Ranunculus flabellatus*) was to meet with the veteran Mr. Piquet, now considerably over eighty, and to find him active and vigorous, and botanically as keen as ever. To him, to his son, to Mr. Lester-Garland, and Mr. E. D. Marquand my best thanks are due for their great kindness.

The following is a list of the more interesting forms noticed in localities which are mainly additional to those given in the published Floras. The sign † means an addition to the island.

Ranunculus sceleratus L. Rare in Guernsey; I saw it at Perelle Bay.—*R. Flammula* L. Not uncommon and variable. The large form, var. *serratus* Pers., grew near St. Ouen's Pond, Jersey, and in the Grande Mare, Guernsey. On the damp spots on L'Ancresse Common *R. Flammula* occurred as a diminutive form with the facies of *R. reptans* L., but it was not creeping. In the damp gully near Grosnez, Jersey, it occurred as a small stout form.—*R. Lingua* L. still occurs in the pond on Longy Common, Alderney, the only locality in the Channel Isles.—†*R. Steveni*

Andrj. In the Waterworks Valley, near Bouley Bay, Jersey. Near Vale, Guernsey.—†*R. Borœanus* Jord. Trinity, Jersey; and as the †var. *tomophyllus*, Grande Mare, Guernsey.—*R. Ficaria* L. A form with more contiguous petals, that is, less star-like than usual, at Petit Bot, Guernsey, deserves further study.

Papaver somniferum L. As the var. *setigerum* and var. *glabrum*, Millbrook, Jersey.—*P. Rhœas* L. †var. *Pryorii* Druce. St. Aubin's, Jersey.—*P. dubium* L. †var. *Lamottei* (Bor.). Sark.—*P. Argemone* L. Bel Royal, Jersey.

Glaucium luteum Scop. Not only on the coast, but also on the drifted sand inland, at Don Bridge, Jersey.

Fumaria capreolata L. Near Cobo, Guernsey. †Near Rozel, Jersey, 1877; not given for Jersey in the *Flora*.—†*F. speciosa* Jord. Near Vale Castle, Guernsey; the first certain record. A very beautiful species.—*F. Borœi* Jord. Abundant in all the islands, as at St. Helier's, St. Ouen's, L'Etac, St. Aubin's, &c., Jersey; Vale, Vazon, Cobo, St. Andrew's, Perelle, &c., Guernsey; Dixcart, Vallette, &c., Sark; Braye, Longy, &c., Alderney.—†Var. *serotina* Clavaud. Cobo, Guernsey. Under this, for the present, Mr. H. W. Pugsley, who has kindly named these *Fumariæ*, puts a plant with almost globose fruit, indicating a passage to *F. muralis* Sond., which I gathered at Cobo and St. Andrew's, Guernsey, and in Sark; but he says he has seen similar from Britain, and he believes it is a constant form, in which case it is perhaps worthy of a varietal name.—†Var. *verna* Clavaud. Plants near to this grew at Millbrook, Jersey.—*F. confusa* Jord. Less common in the islands than *F. Borœi*, but still widely distributed and frequent. †St. Ouen's, St. Helier's, &c., Jersey, for which it is a new record, unless indeed it is the plant referred doubtfully to *F. muralis* in the *Flora of Jersey*. St. Martin's, St. Andrew's, Cobo, Vazon, Guernsey; Alderney; Sark.—†*F. officinalis* L. Sark; new to the island. A lax rampant form in Alderney.

Mathiola sinuata Br. Was in splendid flower and very luxuriant in St. Ouen's Bay, Jersey; one of our most beautiful species.

Radicula Nasturtium-aquaticum Rendle & Britten †var. *microphylla* (Reichb.). Near Grosnez, Jersey.

†*Barbarea verna* Aschers. (= *B. præcox* R. Br.). Near Vallette; new to Sark.

Cardamine pratensis L. I only saw the variety †*palustris* (Peterm.) in the islands.—*C. flexuosa* With. La Haule, Jersey.

Arabis hirsuta R. Br. Rather plentiful on the sand-hills which are partly covered with vegetation; the sand here contains a considerable percentage of shells, thus affording a calcareous soil.

Cochlearia Armoracia L. Alien; Bel Royal, Jersey.—*C. danica* L. Often growing on walls, as well as on rocks and in turf, as at St. Helier's, Jersey, and Petit Bot, Guernsey.

Alyssum maritimum Lam. West Mount, &c., Jersey.

Sisymbrium officinale Scop. †var. *leiocarpon* (Jord.). Vale, Guernsey. Also in Sark, but the type is the commoner plant.

Brassica Cheiranthus Vill. Much increased in frequency in

Jersey, and a very beautiful species; also at Vale, in Guernsey, but I was unable to find it in Alderney. — *B. incana* Doell. (= *B. adpressa* Boiss.). Remarkably abundant in Alderney; also in several places in Jersey, as at Don Bridge. At Braye, Alderney, the var. *hirta*, described by Babington in Prim. Fl. Sarn. as having "Siliquis hirtis rostro glabro," under the name of *Erucastrum incanum* Koch var. *hirtum*, also occurred. — *B. Rapa* L. †var. *Briggsii* H. C. Wats. Near Millbrook, as a casual.—*B. alba* Boiss. Casual; St. Saviour's, Jersey. — *B. nigra* Koch. At St. Aubin's, Jersey.

Diplotaxis muralis DC. var. *Babingtonii* Syme. Bel Royal, Jersey.

Lepidium Draba L. St. Luke's, Jersey; St. Martin's, Guernsey.

†*Erophila præcox* DC. At L'Ancresse, &c., Guernsey; †near St. Aubin's, Jersey.

†*Coronopus didymus* Sm. Near the Harbour, Sark; new to the island.—*C. Ruellii* All. St. Helier's, St. Luke's, Jersey.

Thlaspi arvense L. St. Luke's, Jersey; rare.

Raphanus maritimus Sm. †var. *alba*. On the sands of St. Ouen's Bay. With the type, which was in great plenty, occurred many plants with pure white flowers. On June 23rd the bright flowers of this species was a conspicuous feature in the flora, on the 30th the petals were practically absent, so short in this year was the flowering season. The type is common at West Mount and Bel Royal, Jersey.

Reseda alba L. As a casual, Beaumont, Jersey.

†*Viola canina* L. The sand-hill form, with leaves suggesting *lactea*, near La Moye, new to Jersey, as the old record was almost certainly for the aggregate plant. Also from Petit Bot, Guernsey, as the var. *ericetorum*. — *V. nana* Godr. Abundant among the short vegetation on the sand-dunes of the Quenvais and St. Ouen's, Jersey, and on L'Ancresse Common, Guernsey. The flowers are very small, and usually very pale yellow, but in spring the bluish petalled form was commoner.—†*V. obtusifolia* Jord. Sark.

Helianthemum guttatum Mill. I found a few plants with unspotted petals near Fiquet Bay, Jersey, but the dry season had practically burned up the greater part of the plants. This form had not been noted by Mr. Lester-Garland.

Polygala oxyptera Reichb. Common on the sand-dunes of St. Ouen's Bay.

Silene latifolia Rendle & Britten (= *S. inflata* Sm.). Rare; near Bel Royal, Jersey. Also near Vale, Guernsey, where the plant is very rare. Both plants appeared to be the var. *brachiatus* (Jord.).—†*S. dubia* Herbich (= *S. nutans* L. var. *dubia* (Herb.)). St. Aubin's towards Portelet, Beauport, Don Bridge. Possibly this is the only form of *S. nutans* in Jersey.

†*Lychnis alba* × *dioica*. St. Aubin's, Jersey; near St. Martin's and Vale, Guernsey. — *L. Githago* Scop. Rare; Bel Royal, Jersey.

Dianthus gallicus Pers. This was just in flower in June. It

is confined to a single spot on the dunes, but there it is very abundant and increasing. Some of the plants have very large woody tap-roots; but I believe the plant has been introduced within the last twenty years, as it is scarcely possible for so conspicuous and beautiful a species to have escaped attention. The flowers are deliciously fragrant.—†*D. deltoides* L. One spot near Bouley Bay (Mr. Piquet).

Cerastium tetrandrum Curt. In all the islands, but the drought had dried it up in most cases. On the cliffs near Essex Castle, Alderney, a plant allied to this occurs; it is similar to one I found on a colline near Hyères. The leaves are broader and a darker green than the type, and the plant forms dense tufts; the peduncles are elongated.—*C. vulgatum* L. (*C. triviale* Link). At St. Aubin's, Jersey, a form occurred as a tall rigid plant having clustered cymes and short capsules, and shorter, broader, and less acuminate sepals. That this is not the result of dryness of soil is shown by some plants which I gathered in the driest parts of the Quenvais, which, although much reduced in size (about a sixth of the St. Aubin's plant), have the long peduncle, the long capsule, and more acute and narrow sepals of the typical plant. In other plants from the Quenvais and St. Aubin's the sepals were very narrow and elongate, suggesting the influence of *tetrandrum*.—†Var. *pentandrum* Syme. This annual dwarfed form occurred at Petit Bot Bay, Guernsey.

Sagina maritima Don. At St. Helier's, Jersey, and at Vazon, Guernsey, it occurred as the var. *densa* (Jord.); in Alderney, at the Corblets, and on West Mount, Jersey, as the var. *debilis* (Jord.). A plant from Fort Essex, Alderney, is near var. *prostrata* Towns.—*S. apetala* Ard. Common and luxuriant in all the islands. —*S. ciliata* Fries. †Dicart; new to Sark. In Alderney very uxuriant as the var. *ambigua* at Corblets. Also on West Mount, Jersey.—Var. *patula* (Jord.). At St. Helier's, &c., Jersey, and Alderney; and it is the commoner form in Guernsey. Marquand says *patula* has glandular peduncles. Some of the plants were large, prostrate, and very glandular. All four species of *Sagina* grew close to the Grand Hotel, Jersey.

Arenaria leptoclados Guss. †var. *visoidula* Rouy & Fouc. At Corblets, Alderney, and the Quenvais, Jersey.—*A. serpyllifolia* L. In all the islands; and as the var. *macrocarpa* Lloyd on the Quenvais, Jersey.

Stellaria media With. var. *apetala* Gaudin (*S. Boræana* Jord.). Plentiful at St. Aubin's, Jersey, and L'Ancresse, Guernsey.

Spergula arvensis L. (*S. vulgaris* Boenn.). Alone noticed. Near La Vallette, Sark, a very large form was observed with larger flowers than the normal plant; it is near to, if not identical with, the †var. *maxima* Weihe.—Var. *nana* E. F. Linton. In our chief floras the habitat of *Spergula arvensis* is given as "cultivated ground," and its time of flowering from "June to August." Dunn, in the *Alien Flora*, it is true, says: "Native on the shores of the Mediterranean Sea, and, more rarely so, in other parts of Europe, including Britain. In this country it is, however, much more

common as a weed of sandy cultivated ground." This form is, however, a native of the short close turf on the coast of Guernsey, being especially abundant about Petit Bot Bay and L'Ancresse, Guernsey, and also occurring in Alderney and Jersey. Mr. Marquand has known it for many years, and the Rev. E. F. Linton (see his note, p. 380) has had it in cultivation. It is one of the earliest species to flower, being in full bloom in February and March. The habit is that of *Sagina procumbens* for which, in the flowerless condition, the rosettes, from 1 to 3 in. across, might be mistaken. The seeds are papillate; the plant is more or less glandular, but less conspicuously so than in the type.

Spergularia rubra L. Abundant in Jersey, and often a very luxuriant plant.—*S. rupestris* Lebel. Common in Jersey, Guernsey, and Alderney, and forming a large part of the vegetation of Berhou (Marquand), and usually very glandular. In cultivation the plant is much altered in appearance, losing its turgidity, and becoming a slender straggling plant.—*S. neglecta* Syme. Corbière Rocks; only one station given in the *Jersey Flora*.—**S. atheniensis* Aschers. (= *S. diandra* Boiss. var. *atheniensis* mihi). Near St. Helier's, Jersey, on mobile sand. This plant, which has a wide range of distribution along the Mediterranean coast of Europe, from Phaleron, near Athens, to Cadiz, does not appear to have been recorded for the north-western coast of France. It differs from *S. rubra* by the stipules being blunt and broadly triangular and dull, not narrow-lanceolate and silvery white in colour. The central rosette of leaves characteristic of *S. rubra* is also lacking; the seeds are larger; the capsule also differs in shape. From *S. neglecta* it may be known by its much smaller capsule, more slender branches, and different habit.

Polycarpon tetraphyllum L. This plant, as Mr. Lester-Garland points out, exists under two different modifications. The one, which may be taken as the type, is found by the waysides, at the base of walls, and in cultivated ground, and is the much larger plant, with larger and darker-coloured leaves, and more numerous flowers. The second is a much smaller plant, of a yellowish-red tint, with fewer flowers, and a very different habit. This is found on the sand-dunes and other dry uncultivated places. I was too late to find it in flower in 1906, and too early in 1907, but it has much the appearance of *P. alsinifolium* DC., which is said to differ in the number of the stamens, having five, while *P. tetraphyllum* has three only. Corbière admits it as a native of the sand-dunes in Normandy, but Rouy & Foucaud (*Fl. France*, iii. 313) say it is limited to the Mediterranean. In Alderney a less extreme form (*P. tetraphyllum* var. *densum* Rouy & Foucaud) was found on the dunes.

Hypericum linariifolium Vahl. Fiquet Bay.—*H. humifusum* L. Occurs often as a larger plant with broader leaves than the common English form. I saw no specimens suggesting hybridity.

Lavatera sylvestris Brot. A plant on the railway near Millbrook, Jersey, and another near the Grande Havre, Guernsey;

apparently casual only.—*L. arborea* L. Appears to be native in both islands.

Malva moschata L. var. *heterophylla* Lej. St. Ouen's, Jersey.

Geranium sanguineum L. Still exists as a patch about two yards across in Alderney.—*G. rotundifolium* L. Near Don Bridge, and in a native-looking situation at the north side of St. Ouen's Bay, Jersey.—*G. Robertianum* L. var. *purpureum* (Vill.). Under this name Mr. Lester-Garland puts a frequent Jersey plant with small flowers, which also occurs at Vale, &c., Guernsey. *G. Robertianum* is absent from Sark.

Erodium cicutarium L'Hér. †var. *pallidiflorum* (Jord.). A non-glandular pale-flowered form on the Quenvais, Jersey.—*E. moschatum* L'Hér. The white-flowered plant is common at St. Ouen's Bay.

Oxalis corniculata L. This unstoloniferous plant of Jersey, which is common about St. Helier's, occurs also at L'Ancresse, &c., Guernsey. It is stipulate, and with strongly pubescent carpels. I do not adopt the views recently expressed by Mr. Robinson in Journ. Bot. 1906, 390, respecting the reversal of the names for the two *Oxalis* of our lists, but use them in the same sense as Syme, Hooker, and Babington do.

(To be continued.)

NEW CHINESE PLANTS.

By S. T. Dunn, B.A., F.L.S.

6095 **Prunus marginata**, sp. nov. Arbor parva, præter novellos et inflorescentiam glabra. Ramuli cinnamonei. Folia oblanceolata, integra, margine cartilagino, revoluto, 5–6 cm. longa, coriacea, supra nitentia, costa impressa, epunctata, subito obtuse acuminata, basi in petiolum 6 mm. longum gradatim angustata, venis obscuris. Racemi axillares, 2 cm. longi, pedunculo pubescente. Calycis tubus 2 mm. longus, interne sericeus, extus glaber; lobi 5, tubo æquilongi, lanceolati; petala 5, orbicularia, unguiculata, 3–4 mm. longa, staminibus longiora. Ovarium glabrum.

Kwantung, Peak of Lantao Island at 1500 ft. Hongkong Herb. 1430.

A near ally of the following species from which, however, it is at once distinguished by its tapering epunctate leaves.

Prunus Fordiana, sp. nov. Arbor parva, præter ramulos juniores omnino glabra. Ramuli nigri, juniores puberuli. Folia elliptica, integra, margine cartilagino, nigrescentia, 4–5 cm. longa, subcoriacea, supra nitentia, costa impressa, subtus punctata, obtuse acuminata, basi cuneata, venis obscuris, petiolis 3 mm. longis. Flores ignoti. Racemi axillares, pedunculi communes 15 mm. longi; drupæ ovales, 8 mm. longæ, pedicellis 5 mm. longis.

Sanning, S. Kwantung. Dunn's native collector. Hongkong Herb. 903.

Differs from *P. punctata* Hook. f. in its obscurely veined, margined leaves. The name of this species commemorates the admirable industry in investigating the Kwantung flora of my official predecessor, Mr. Charles Ford, I.S.O.

Randia acutidens Hemsl. and Wilson, var. LAXIFLORA Dunn, var. nov. Cymæ laxe trichomæ, 3–5 cm. longæ.

Happy Valley, Hongkong. "Shrub 6–7 ft. with orange-scented cream-coloured flowers, 18.4.05. *W. J. Tutcher.*" Hongkong Herb. 2264.

Saussurea setidens, sp. nov. Herba erecta, præter flores omnino glabra, 10–15 dm. alta. Caulis valde striatus, pauciramosus. Folia caulina inferiora lanceolata, margine dense setoso-serrata, 15–20 cm. longa, papyracea, elongato-acuta, basi acuminata, in petiolum alatum angustata. Capitula 1–2 in ramorum apicibus. Involucrum hemisphæricum, 2 cm. latum, bracteis ligulatis, mucronatis, adpressis tenuiter arachnoideis, paucis exterioribus, foliaceis, longioribus. Corollæ 16–18 mm. longæ, læte purpureæ, inferus filiformes, medio expansæ, parte expansa infra medium lobata, lobis patentibus linearibus, 5–6 mm. longis; pappus 15 mm., longus plumosus.

Shady woods near Seoul, Korea. Hongkong Herb. 4372.

A considerable collection of Korean plants was made by the writer in the late summer of 1906, in the neighbourhood of the ports of Fusan and Mukpo and around the capital, with the object of supplying the deficiency of species from that region in the Colonial Herbarium at Hongkong. Although the present species was the only novelty observed, a number of plants were collected which had not been previously recorded as Korean.

Loxostigma aureum, sp. nov. Herba perennis. Rhizoma repens. Caulis 6–8 cm. longus, dense brunneo-lanatus. Folia, præter 1–2, in apice cum bracteis foliaceis pedunculisque aggregata, ovata, breviter crenato-serrata, 6–10 cm. longa, membranacea, in venis tenuiter lanata, acuta, basi obtuse cuneata vel rotundata, nonnunquam obliqua, venis crebris, curvatis, ascendentibus, petiolis 1–2 cm. longis, sicut caulibus vestitis. Pedunculus filiformis, 2–3-florus, 2 cm. longus. Flores magni, pedicellis 5–10 mm. longis; calyx 5-partitus, lobis linearibus, subglabris, 7–8 mm. longis; corolla lutea; tubus medio ampliatus ore obliquus, breviter 5-lobatus, 6 cm. longus, basi 3 mm., medio 10 mm., ore 15 mm. latus, lobis rotundatis, 3–5 mm. longis. Stamina in media corolla liberata, os haud assequentia; ovarium angustum in stylum longum attenuatum.

Sha Kau, N.W. River, Kwantung. Ford's native collector. *Ford* 249.

Chirita sinensis Lindl. var. nov. ANGUSTIFOLIA. Folia anguste lanceolata, in petiolum alatam gradatim attenuata.

Kwantung, Hongkong New Territories; in crevices of damp rocks amongst the northern precipices of Ma-on-Shan. Dunn's native collector. Hongkong Herb. 1135.

Both the type and variety affect damp mossy hollows, especially where water drips down over vertical rocks, and in such situations the former is common in the island and neighbouring parts of the mainland.

Beilschmiedia Fordii, sp. nov. Arbor 6–7 m. alta, omnino glabra. Folia sæpe opposita, lanceolata, integra, margine revoluta, 8–12 cm. longa, crasse coriacea, apice obtuse, basi gradatim acuminata, supra lucida, costa impressa, venis secundariis pluribus, obscuris, pinnatis, ascendentibus, petiolis 10–15 mm. longis. Cymæ axillares, densæ, 2–3 cm. longæ, pedunculis crassis 1 cm. longis. Calyx deciduus; segmenta obovata, 2 mm. longa; stamina eis æquilonga, antheris 2-locellatis; ovarium globulare, stylo brevi. Drupa ovalis, 14–18 mm. longa, utrinque rotundata, pedicello paullo incrassato.

A tree four feet in diameter at base. Happy Valley, Hongkong, 12. 8. 1881. *Ford.*

Elæagnus Tutcheri, sp. nov. Frutex præter foliorum paginam superiorem, ovaria, corollæque pube stellata peltata omnino vestitus. Folia suborbicularia vel ovata, 4–8 cm. longa, subcoriacea, sæpe bullata, supra nitentia, venis utrinque paullo prominulis petiolis 6–8 mm. longis. Flores in racemis abbreviatis vel fasciculis paucifloris axillaribus dispositi, pedunculis 2–3 mm. longis. Calyx supra ovarium campanulatus, 7–8 mm. longus; tubus basi rotundatus, 3 mm. latus, lobis ovatis, erectis, mucronatis paullo longior; ovarium anguste ovatum, apice constrictum, 3 mm. longum. Drupa oblongo-ovata, utrinque rotundata, endocarpa sericea, utrinque 3-carinata.

Cape D'Aguillar, Hongkong, *W. J. Tutcher.* Hongkong Herb. 2105.

This interesting species appropriately bears the name of its discoverer, my friend and colleague Mr. Tutcher, who has for many years, and with marked success, devoted his spare time at the proper seasons to exploring the flora of the British territory.

ALABASTRA DIVERSA.—Part XV.

By Spencer le M. Moore, B.Sc., F.L.S.

(Continued from p. 334.)

4. Note on some South American Plants.

In this Journal for 1904 (pp. 33, 100) an account was given of the gamopetalous plants which M. A. Robert had recently sent home from Matto Grosso and northern Paraguay, with descriptions of the supposed novelties therein contained. A few omissions which have come under my notice are here supplied, and the opportunity is taken, while doing this, of remarking upon a few plants from my own South American collections.

Borragineæ.

Saccellium sp. an *S. lanceolatum* Humb. & Bonpl. Pl. Æquin. i. p. 47, t. 13 ?

Corumbá ; *Robert*, 804.

This genus was founded by Humboldt and Bonpland in 1808 (*l. c.*) upon a specimen from Loxa in Peru. The description, however, was faulty in many respects, and it was not till several years after that Kunth's careful study of the fruit (Nov. Gen. et Sp. Pl. vii. 207) gave a clue to the affinity of the plant. Much doubt still remained respecting the genus, till in 1879 appeared Grisebach's *Symbolæ ad Floram Argentinam*, and there (p. 270) he describes a *Saccellium*, identified with *S. lanceolatum* Humb. & Bonpl., as occurring in the province of Oran. After Kunth's careful examination, the chief uncertainty *à propos* of *Saccellium* concerned the flower, Humboldt and Bonpland having described this as polypetalous, with antipetalous stamens. Grisebach, however, found the corolla to be gamopetalous, with the stamens inserted in the throat; and this statement I can confirm, although the flowers at my disposal (they are very small at time of pollination) have not been quite what one would desire.

I am not sure that Grisebach is correct in referring the Argentine plant to *S. lanceolatum*. To take the leaves alone, which is almost all we have to depend upon, these organs are lanceolate and six inches long in the type, whereas Grisebach's plant, like M. Robert's under notice, has oblong lanceolate leaves. The Göttingen professor gives no measurements; the Matto Grosso plant, in all probability conspecific with the Argentine, has much smaller leaves, only $1\frac{1}{2}$–$2\frac{1}{2}$ inches in length. The name given above must therefore be regarded as provisional.

I have failed to find any recent record relating to this rare and interesting genus, and, so far as I am aware, this is the first announcement of a Brazilian habitat for it. But seeing that the neighbourhood of Corumbá has been visited lately by several zealous botanists, specimens of *Saccellium* most probably form part of their collections.

Bignoniaceæ.

Jacaranda rufa Manso, Enum. subst. braz. p. 40.

Sant' Anna da Chapada ; *Robert*, 419 and 709.

Flowers were gathered in July, fruits in November.

Jacaranda (§ Monolobos) **Roberti,** sp. nov. Stirps humilis e rhizomate sat crasso caules breves ascendentes piloso-pubescentes et folia perpauca sese longe excedentia gignens, foliis bipinnatis 4–6-jugis pinnis oppositis vel suboppositis vel hac atque illac manifeste alternis imparipinnatis 5–20-jugis, foliolis oblongis vel lineari-oblanceolatis apice mucronatis basi decurrentibus margine revolutis coriaceis fac. sup. glabris inf. piloso-pubescentibus juvenilibus aliquantulum bullulatis, panicula caulem terminante abbreviata angusta pauciflora piloso-pubescente, bracteis anguste lineari-oblanceolatis pedicellis subæquilongis, calyce campanulato extus piloso-puberulo intus glabro ultra medium in lobos late oblongos

apice brevissime cuspidulatos ipso obtusiusculos diviso, corolla comparate elongata infundibulari ima basi aliquantulum expansa extus glanduloso-puberula intus pilosa, filamentis basi dense glanduloso-pubescentibus ceterum glabris, antheris unilocularibus apice obtusis basi breviter appendiculatis, staminodio stamina bene excedente dense glanduloso-barbato.

Hab. Matto Grosso, Sant' Anna da Chapada; *Robert*, 675.

Caulis summum 4·0 cm. alt., 0·2–0·3 cm. diam., aliquanto angulatus. Foliorum rhachis valida, 10·0–25·0 cm. long., deorsum nuda, pilosa, fac. sup. canaliculata; pinnæ 5·0–10·0 cm. long., fac. sup. item canaliculatæ; foliola 1·0–1·3 × 0·3-0·4 cm., fol. terminale obovato-oblongum, 0·45–0·6 cm. lat. Panicula circa 3·5 cm. long. Bracteæ 0·3-0·4 cm., pedicelli 0·4–0·5 cm. long. Calyx 0·5 cm. long.; hujus lobi 0·4 cm. long. Corolla 4·5–5·0 cm. long.; tubus ima basi 0·5 cm., paullo supra basin 0·35–0·4 cm., sursum adusque 1·5 cm. diam. gradatim augmentatus; lobi circa 1·0 × 0·9 cm., facie interiori pilosi. Filamenta longiora 1·3 cm. long.; antheræ 0·3 cm., harum appendix 0·06 cm. long.; staminodium 2·75 cm. long., deorsum glabrum. Stylus glaber.

The only species with which this can be compared is *J. decurrens* Cham. which also has decurrent pinnules, but its leaves have many more *jugæ*, and the leaflets are different in shape. Among other points, the long corollas of *J. Roberti* are worthy of mention.

An immature fruit, 3·0 × 2·0 cm., accompanies the specimen.

Podostemaceæ.

I brought from Matto Grosso two of these plants, but, by some oversight, no mention was made of them in my Memoir (Trans. Linn. Soc. Ser. 2, vol. iv.). For calling my attention to this matter I am indebted to Dr. Rendle, who also gave me the following names:—

Lonchostephus elegans Tul. in Arch. Mus. Par. vi. p. 198.

Fixed to stone in bed of R. Paraguay about Santa Cruz (Barra dos Bugres); 709.

Mniopsis scaturiginum Mart. Nov. Gen. et Sp. i. p. 3.

Attached to stone in bed of R. Paraguay above Santa Cruz; 711.

Euphorbiaceæ.

A short time ago I saw in the Kew Herbarium a specimen of the South American *Croton sparsiflorus* Morong, which had, curiously enough, turned up in the neighbourhood of Calcutta, its introduction having been due most probably to transport of grain. Opportunity is taken to mention this fact here as it should be known that Morong's plant has since been twice redescribed. My own *C. nivifer*, published a little time after *C. sparsiflorus* appeared, is undoubtedly the same plant; and more recently MM. Chodat and Hassler have given (Bull. Herb. Boiss. 1901, p. 395) the name *Croton rivinoides* to specimens absolutely identical with those of Morong.

DR. ST. BRODY'S WORK IN GLOUCESTERSHIRE.

By James W. White, F.L.S.

A valuable asset in Gloucestershire botany appears to have been lying unregarded for many years in a collection formed by the late Dr. O. St. Brody during his residence at Gloucester, which is now housed in the City Technical Schools. This herbarium is entirely restricted to plants of the county; it furnishes evidence of most careful and accurate work (which the author's much earlier publication—the *Flora of Weston-super-Mare*—did not suggest); and it gives us a number of new records. These were made chiefly in the Bristol district, along the Severn shore at the Passages; on that little bit of seaboard which confers upon Gloucestershire some semblance of a maritime county. There the plants seem to have remained unnoticed by Thwaites, Stephens, and other Bristol botanists, although they might have reached the ground more easily than St. Brody could from Gloucester. This reflection, of course, rests on me also, but somewhat less strongly perhaps, for I have had the satisfaction of finding several of the species, without, however, realizing their importance; and one or two had become extinct before my time. The discovery of these specimens is well timed, in view of a recent announcement by Gloucestershire botanists of their intention to prepare a complete county Flora.

The following finds by Dr. St. Brody appear to be topographical additions to vice-county 34:—

Vicia lathyroides L. Near the Old Passage; June, 1867.

Eryngium maritimum L. Severn shore; July, 1869. Now extinct in the county. In 1887 there was a fair number of plants on a shingly beach below the New Passage. In October, 1901, one plant only could be found; excursionists and visitors to the neighbouring tea-gardens having rooted out the remainder. One plant still there in 1902, and in 1903. But a little later there came a heavy storm on a high tide; the waves swept the beach from end to end, and then the last trace of this species in Gloucestershire disappeared.

Galium erectum Huds. Heath near Dursley; June, 1864. This antedates my own gathering of the plant on Breakheart Hill, Dursley, by nearly forty years.

Valerianella dentata Poll. var. *mixta* Dufr. Field at Dursley; July, 1865.

Arctium pubens Bab. New Passage; July, 1864.

Salsola Kali L. Shore, New Passage; July, 1870. Almost certainly extinct. I have never met with a specimen north of Portishead.

Obione portulacoides Moq. Shirehampton; July, 1867. Swete likewise records it from Shirehampton in the *Flora Bristoliensis* prior to 1854. I also saw a small quantity on the Channel side of Avonmouth railway-station in 1879. This was soon afterwards destroyed when work commenced on the first Avonmouth Dock. None has since been seen in Gloucestershire.

Polygonum Raii Bab. (as *maritimum*). Shore, New Passage; July, 1865. The presence of this plant in the county had never been suspected. It is extremely doubtful if another specimen can be found.

Sparganium natans L. In the Berkeley Canal; July, 1865.

Juncus maritimus Lam. Marshes, New Passage; July, 1869. The species is stated by Swete (Fl. Brist. p. 83) to have been seen by himself in Shirehampton Marshes, West Gloucestershire; but St. Brody's specimens are the only ones I have met with from the county.

Phleum arenarium L. Sandy shore, New Passage; July, 1866. Another plant that has almost certainly disappeared from Gloucestershire.

There are a number of other interesting items of less importance in St. Brody's collection. A specimen of *Salvia pratensis* from Wyck Cliffs, dated 1849, forms a curious confirmation of, or coincidence with, Swayne's record for the plant at that place nearly a century earlier.

I cannot hear of any Somersetshire plants which this botanist may have preserved when living at Weston-super-Mare in early life. Could any such be found they would be most welcome. So nomadic and needy a person, however, might not have burdened himself with baggage of the kind. Several of the more unlikely species stated by him to grow in North Somerset—*Antennaria dioica* and *Atriplex laciniata*, for instance—have recently turned up, and it seems to me that St. Brody's reputation for botanical accuracy should stand much higher than some of us have been accustomed to place it.

In a "Report of Progress towards the Completion of the Flora of Gloucestershire," communicated to the Annual Meeting of the Cotteswold Naturalists' Field Club, April 2nd, 1878, by G. S. Boulger, F.L.S., F.G.S., it is stated that prior to that date Mr. Harker had made a thorough examination of "this grand collection [of St. Brody's], comprising 1036 species and 105 varieties, which was meant to be the basis of a County Flora, but the plan was abandoned, as was also a Flora of Clifton, commenced by Mr. M. J. Barrington-Ward." I am not aware if any notes that Mr. Harker may have made during his examination were ever published; or, indeed, if any further progress was made with the projected County Flora.

REPORT OF DEPARTMENT OF BOTANY, BRITISH MUSEUM, 1906.

By A. B. Rendle, D.Sc., F.L.S.

The following additions have been made to the collections by presentations:—100 phanerogams from the Director of the Royal Botanic Gardens, Sibpur, Calcutta; fruits of *Lodoicea sechellarum*, from J. Stanley Gardiner, Esq.; 468 phanerogams from Uganda, from Dr. A. G. Bagshawe; specimens illustrating the life-history

of *Crocus* for the Public Gallery and a species of *Statice* from E. A. Bowles, Esq.; 20 specimens of *Polygala amarella*, illustrating variation from J. Cryer, Esq.; 3 phanerogams from India, from Dr. T. Cooke; 3 specimens of cultivated plants and 3 enlarged photographs, from Hon. Walter Rothschild, M.P.; 126 phanerogams and 7 cryptogams from Jamaica, from Dr. N. L. Britton; 109 phanerogams and 1 cryptogam from South Rhodesia, from Miss L. Gibbs; 22 phanerogams from South Africa and Rhodesia, from H. T. Crosfield, Esq.; 208 phanerogams from South Rhodesia, from Fred. Eyles, Esq.; 3 cultivated plants from Walter Ledger, Esq.; 6 photographs of fossil fruits of *Najas* and *Zannichellia*, from Clement Reid, Esq.; 7 phanerogams from Tropical Africa, from Dr. Engler; 10 photographs of Rubber Forests on Amazon, from H. E. Weaver, Esq., M.I.C.E.; 272 phanerogams, 15 cryptogams, and 28 fruits from South Rhodesia, from C. F. M. Swynnerton, Esq.; 261 phanerogams and 7 cryptogams from Mt. Ruwenzori, collected by Dr. Wollaston, from the subscribers to the Ruwenzori Expedition; 9 phanerogams from South Europe, from H. Stuart Thompson, Esq.; 3 phanerogams and 7 cryptogams from British East Africa, from A. Cholmley, Esq.; 4 specimens of cultivated plants, from T. O'Brien, Esq.; 66 phanerogams and 4 cryptogams from Shan States, from S. A. Durie, Esq.; 2 reproduced copies of Roslin's portrait of Linnæus, from W. Carruthers, Esq.; 50 European lichens, from the Council of the Linnean Society; 47 Japanese mycetozoa, from K. Minakata; an apochromatic microscope-objective, from Lady Sendall; a large specimen of *Laminaria* from the Eastern Telegraph Company's cable near Gibraltar, from V. K. Cornish, Esq.; 24 marine algæ from Sidney, N.S.W., from A. H. Lucas, Esq.; portraits of Elias Fries and J. G. Agardh, from G. Murray, Esq.; marine algæ and mosses from the National Antarctic Expedition; 54 phanerogams and 9 cryptogams collected in the Great African Lakes by Dr. W. C. Cunnington, from the Tanganyika Committee through Professor Ray Lankester; and single specimens from Prof. J. B. Farmer, Franklin White, Esq., and Herr Per Dusén.

The additions to the British Herbarium by presentation have been:—7 specimens of *Fumaria* from H. W. Pugsley, Esq.; 220 specimens from Rev. E. S. Marshall; 72 specimens from Rev. H. J. Riddlesdell; 15 specimens from C. E. Salmon, Esq.; 49 specimens from G. C. Druce, Esq.; 18 specimens from A. Bennett, Esq.; 5 specimens from H. Stuart Thompson, Esq.; 29 specimens from Prof. D. Oliver; 80 specimens from Rev. E. F. Linton; 60 species of marine algæ from near Dover, from Miss G. E. M. Mitchell; 21 hepaticæ from Westmorland, from W. H. Pearson, Esq.; 2 mosses and a hepatic from W. R. Sherrin, Esq.; and one or two specimens from W. R. Jeffrey, W. H. Hammond, J. W. White, E. M. Holmes, A. B. Jackson, S. S. Buckman, H. R. Yates, Arthur Lister, Miss A. Lorrain Smith, C. P. Hurst, and Dr. W. H. Lang.

Among the acquisitions by presentation special reference may be made to the lichen-herbarium of the late Rev. J. M. Crombie,

presented by his widow, and containing about 5000 British and foreign lichens, his MSS. and correspondence, and about 30 bound volumes of lichenological pamphlets by Nylander, J. Müller, and other authors.

The following additions have been made by exchange of duplicates :—136 specimens from South Africa from the Botanic Museum, Zurich, through Prof. Hans Schinz; 6 specimens of *Allophyllus* from Tropical Africa, through Dr. Engler; 3 violas from Texas and Mexico from the National Museum, Washington, through R. Rathbone, Esq.; 33 orchids and 97 cryptogams from the Oakes Ames Botanical Laboratory, North Eastern, Mass., U.S.A.; 384 specimens from California from the University of Pennsylvania, through Prof. John Macfarlane; 240 specimens of Australian plants from J. H. Maiden, Esq.; 96 specimens from North America from the Gray Herbarium, Cambridge, Mass., through Dr. B. L. Robinson; 142 phanerogams and 4 cryptogams from South Africa collected by Penther and Krook, also 10 plates by Ferdinand Bauer, and Kryptogamæ Exsiccatæ, cent. xii, xiii, from the Vienna Hofmuseum, through Dr. A. Zahlbruckner; 249 phanerogams and 30 cryptogams from Botanic Gardens, Singapore, through H. N. Ridley, Esq.; 150 ferns collected in the Philippine Islands by E. P. Copeland, from the Bureau of Agriculture, Manila, through Prof. Elmer D. Merrill.

The principal purchases during the year were :—233 phanerogams from Gunong Tahan, Pahang, from H. C. Robinson; 200 specimens Flora Stiriaca Exsiccata (fasc. iii.–vi.), from Hayek; 233 specimens from West Indies, series III., 1904–5, from A. H. Curtiss; 96 specimens from Somaliland, from G. W. Bury; 828 specimens from South Africa, Plantæ Schlechterianæ, from Dr. Loesener; 33 specimens from California, from A. A. Heller; 465 phanerogams and 70 cryptogams from Selkirk, from Chas. Shaw; 165 phanerogams and 39 cryptogams from Bolivia, collected by Fiebrig, from Dr. R. Pilger; 215 specimens, including 10 cryptogams from Siam, collected by Dr. Hosseus, from Dr. Wilms; 1000 specimens including 119 cryptogams, from Yunnan, from Dr. Henry; 763 specimens from Japan, from Rev. U. Faurie; 239 microphotographs of wood structure, from Williams, Weale & Co.; 200 specimens Fl. Carniolica, cent. 7 and 8, collected by Paulin; Gramineæ Exsiccatæ (fasc. xix, xx), from Kneucker; 50 specimens (Salicetum Exsiccatum, fasc. i.) collected by Toepffer, from Dulau & Co.; 200 specimens (Batotheca Europæa, fasc. i.–iv.) from H. Sudre; "Wooden Rose" from Guatemala, from Rosenberg; 100 fungi imperfecti, from Kabát and Bubák; 50 North American algæ, from Collins, Holden and Setchell; 150 micro-fungi, from Vestergren; 50 ascomycetous fungi, from Rehm; 50 fungi selecti, from Jaap; 100 cryptogams of Germany, Austria, and Switzerland, from Migula; 100 North American fungi, from Bartholomew; 50 mosses of the Malay Archipelago, from Fleischer; 100 Brazilian fungi, from Ule; 100 Uredineæ, from Sydow; 170 cryptogams of N.W. India, from Gollan; 100 Saxon fungi, from Krieger; 12 prepared British fungi, from Hartley-

Smith; 15 water-colour drawings of British lichens for exhibition, by Highley.

Among the acquisitions by purchase special mention should be made of the cryptogamic herbarium of the late William Phillips, containing about 10,000 British and exotic fungi, 800 lichens, 53 algæ, and 3200 drawings of fungi.

SHORT NOTES.

Linaria arenaria DC. in England.—This species, hitherto only known from a limited area of the coast of Western France, where it occurs on the maritime sands of Gatteville de la Manche, Neuville, Gouberville, &c., and is represented in the Reliquiæ Maill. no. 1502, from Cherbourg, was recently shown to Dr. F. J. Smith by Mr. F. G. Fisher, who discovered it near Westward Ho, in North Devon, and was identified at the National Herbarium, to which specimens were taken by Dr. Smith. Mr. Britten told me of this interesting discovery, and I went down to the locality to form an opinion as to the claims of the *Linaria* to be considered indigenous there. The plant occurs over a small area, perhaps two hundred yards long, growing among sand and large pebbles, with *Trifolium scabrum*, *Lotus corniculatus* var. *crassifolius*, *Sagina nodosa*, *Eryngium maritimum*, *Glaucium flavum*, *Plantago Coronopus*, *P. lanceolata* var. *sphærostachya*, *Phleum arenarium*, *Polygonum maritimum*, &c., but with no introduced species. There are traces of traffic near the place, but I think only to cart away shingle. Although *Senecio squalidus* has been introduced to Bideford, and there is still some amount of traffic between the French ports and Appledore with Barnstaple, the locality is well away from these places. There is a considerable amount of drifted timber on the beach, but the place where the plant grows is well above the reach of the highest tide. The whole area of this district is not geologically old, as it appears that the dunes are of comparatively recent formation. My opinion is that, unless intentionally sown, the plant is native here, as it has no claims to beauty or utility, which are influencing causes in the introduction of many species. It is to be hoped that anyone visiting this spot will be careful in gathering this plant, so that it may not be eradicated.—G. Claridge Druce.

[We hope to publish later a figure and description of this interesting plant.—Ed. Journ. Bot.]

Colchicum variegatum L.—In 1849 Mr. Edward Pearson, of Wilmslow, Cheshire, found a *Colchicum*, apparently wild, in considerable quantity on the under side of a large plantation very high up on the hill called Norton Camp, near Craven Arms Railway Station, Shropshire. He has had it in his garden ever since, where it flowers freely, but apparently does not perfect seed. It increases rapidly from the root. The plant proves to be *Colchicum variegatum* L. The same species is also reported as growing about

three miles further south, near Stokesay Castle. Can any local botanist say whether the plant is still to be found in those parts?—W. F. Miller.

Phyllody of the Calyx in Myosotis palustris.—I lately gathered specimens of *Myosotis palustris* on the banks of the river locally known as the Gipping, where it flows through the Glebe Meadows at Barham, in Suffolk. They showed well-marked phyllody of the calyx, together with a distinct prolongation of the flower-spike. The calyx-lobes were twice the size of those of the ordinary form. Every inflorescence borne by this plant showed this variation in equal degree. The corolla also showed a tendency to remain longer than usual on the plant, and to become somewhat virescent in its older stage. As the Gipping nears Ipswich it is now called the Orwell, though it is said Gippeswyche was the old name of the city.—E. Augustus Bowles.

A proposed Exchange Club for Lichens.—With the exception of Mr. Crombie's *Monograph* (1895), the second and concluding part of which is in active preparation by Miss A. L. Smith, little progress has been made in the study of the Lichens of these islands since the publication of Leighton's *Lichen-Flora* in 1871–79. This latter has long been out of date in nomenclature and classification, and our study of Lichens has thus been greatly neglected. It is therefore suggested that it would be stimulated by the formation of a Lichen Exchange Club, on the lines of those already existing for mosses and flowering plants. Another reason for the formation of such a Club is found in the gradual extermination of lichens through smoke and other means to which I have referred in the September number of this Journal. Mr. A. A. Dallman has already suggested the Club in the circulating notebook of the Moss Exchange Club, and it is desired to obtain further publicity for the scheme through the pages of this Journal. Preliminary steps have already been taken, and I shall be glad to receive the names and addresses of those interested in the scheme, together with any suggestions for the working of the Club. These may be sent to me at Ivanhoe, Gwendolen Road, Leicester.—A. R. Horwood.

Juncus pygmæus Thuill. in Cyprus?—In this Journal for 1905, p. 332, I pointed out that the specimens at Kew collected by John Ball "Ex Cypro prope Larnaka Majo 29, 1877, No. 2436" were certainly *J. bufonius*. The late Mr. Ball added, "The only Oriental specimens seen by Boissier" (see Boissier, *Flora Orientalis*, vol. 5). I have now seen Boissier's own specimen at Geneva, bearing the same label, and though it bears a more striking resemblance to *J. pygmæus* than the Kew specimen, it is only Koch's variety *fasciculatus* of *Juncus bufonius* L. Mr. Holmboe, of Bergen, who is studying the vegetation of Cyprus, has also examined the specimen in Herbier Boissier and is quite of the same opinion.—H. S. Thompson.

Limonium recurvum C. E. Salmon.—Readers of the Journal will be glad to learn that this rarest of sea-lavenders still survives

at its original station in Portland Island. In 1902 I could not find any of the plant, and reported its destruction as stated by Mr. C. E. Salmon in these pages (1903, p. 68). Possibly I was then a little too early, or I did not venture near enough to the verge of the cliffs. I now find there remains a short space between two quarries where the cliff-edge has not been cut away; and there, on the extreme overhang of undermined rock, the plant maintains itself, although sadly reduced in quantity from the display I remember to have seen thirty years ago before the demand for Portland stone so destructively revived.—James W. White.

Sagina Reuteri Boiss.—On the 11th August, 1906, I found this plant on the bed of a very old pool, almost dried up, on Skipwith Common, near Selby, in v.-c. 61, with no sign of alien plants of any kind associated with it. Its companions were *Mentha Pulegium*, *Apium nodiflorum* var. *repens*, *Limosella aquatica*, *Rumex maritimus*, *Veronica scutellata* var. *hirsuta*, and *Riccia crystallina*. Additional evidence given by Mr. F. N. Williams, who has examined the plant, points, I think, to its being a native plant. He says:—"Although differing in appearance from the very glandular forms of this plant you have previously sent me (*vide* Ex. Club Rep. 1902), they belong to *S. Reuteri*, and are, indeed, more like the original Portuguese specimens than the Lancashire plants." This was in reply to Mr. Wheldon, who sent Mr. Williams a specimen from me. The Skipwith Common plant is quite eglandular, and only a few plants were gathered, as it was thought at the time to be *S. apetala*.—Wm. Ingham.

Vicia bithynica L.—I found this plant in August near Gurnard's Bay, Isle of Wight, close to the beach in rough grassy ground. This is I believe the first record for v.-c. 10. The plant was reported from near Gosport in 1899, which is the only record for the mainland of Hants.—J. F. Rayner.

Lachnea hirto-coccinea Phill. & Plow.—I found this plant on Strensall Common (v.-c. 62) on July 6th, 1907. It was growing on wet sand and on rotten wood on the border of a temporary water-splash, and Mr. C. Crossland, one of the authors of the *Fungus Flora of Yorkshire*, 1905, regards it as an interesting addition to the county of York.—Wm. Ingham.

NOTICES OF BOOKS.

The Flora of Glamorgan. Edited by A. H. Trow, D.Sc., F.L.S. Section I. Thalamifloræ. Cardiff: Lewis, 1907. 8vo, pp. 43. Price not stated.

It can have happened but seldom—if indeed the occurrence be not, as we believe, unique—that two floras of the same county should proceed concurrently, not only without reference to each other, but apparently in ignorance of each other's existence. Glamorgan, however, is being thus favoured; for simultaneously with the publication in our pages of Mr. Riddelsdell's enumeration,

modestly entitled *A* Flora of the county, comes the first part of what is styled *The* Flora, compiled by a special Committee under the editorship of Professor Trow of University College, Cardiff, published in the Transactions of the Cardiff Naturalists' Society. This Committee was appointed in 1903; Mr. Riddelsdell's appeal for help in his compilation appeared in this Journal for February 1904; and the work of both has been carried on independently.

Mr. Riddelsdell's list has, as he tells us in his preface, "mainly a personal character," but includes the specimens preserved in numerous herbaria; he has, in accordance with general practice, divided the county into districts (which has not been attempted by the Cardiff Committee), and has excluded introduced species (which are given in an appendix) among which he places many plants native in other parts of the country but alien here, and doubtful records.

The Cardiff Committee consisted of nine members, who "at once authorized the issue of circulars to local botanists inviting them to become corresponding members and furnish lists of the wild plants occurring in their respective neighbourhoods." It is no disparagement to the Committee to say that few if any of their names or those of the numerous "active corresponding members" are familiar to British botanists, nor is there any indication that their specimens have been submitted to any competent authority. No one who has not had experience in compiling a local flora can have any idea of the extraordinary mistakes in identification committed by local observers; and we note that Prof. Trow says of *Cerastium glomeratum* and *C. triviale*: "These two common and well-differentiated species are not well understood by our correspondents." The note continues: "Mr. Storrie confuses one of their many forms with *C. arvense*, and is followed in this error by so many others that the complete record is appended. It is almost certainly a case of wrong diagnosis." But in spite of this caution the next entry runs:—

"*arvense*, Linn. Frequent. Penarth, Dinas Powis. *J. S. and T. H. T.* Frequent. *Flora Rhondda.* Frequent in fields and dry places, Barry. Common, Southerndown. *Miss B.* Sully. *G.* Hirwain? *W.*"

C. arvense does not appear in Mr. Riddelsdell's list; a fact which seems to show that its recorders can hardly claim implicit credence even with regard to "common and well differentiated" (and therefore much less in the case of really critical) species. But would it not have been wiser to suppress the record until confirmation had been obtained?

Although this Journal appears in the list of works consulted, it would appear that this has been done very incompletely. For example, *Viola stagnina*, said to "require confirmation," was duly recorded for Gower by Mr. Riddelsdell in 1904 (p. 312); *Hutchinsia*, for which Pennard Castle is the only habitat given, was recorded from Worms Head by T. B. Flower in 1877 (p. 180).

The list is swelled by the inclusion of aliens and erroneous records, in type not differing from the indigenous species. It is

not easy to see what is gained by such an entry as that of *Stellaria palustris*, where the statement "all the records are probably errors" is followed by the records of three correspondents for three separate localities.

We can only hope that succeeding parts of the Flora, if it be continued, will be conducted on different lines, and that care will be taken to include records only from those who are at least able to discriminate between our common Cerastiums and to identify correctly plants so distinct as *Stellaria palustris*. On the present lines, the only result of the work will be to increase the inaccuracies and uncertainties created by Storrie's *Flora of Cardiff*. It is only fair to say that Prof. Trow's own records and observations show that he is a competent and careful observer, but even in his portion we find things that surprise us—the inclusion of *Pæonia*, for example, although it is rightly stated to be a Somerset plant, and the designation of *Corydalis lutea* as "rupestral."

The Principles of Horticulture. By WILFRED MARK WEBB, F.L.S. London: Blackie & Son.

IF Mr. Webb had set himself the task of writing a book on elementary botany, with a spice of entomology and a little nature study, the little book before us would have had some reason for its existence. But when the author tells us that he has written "primarily for the benefit of those engaged" in practical horticulture, we fear he fails to justify his text. The principles of horticulture seem to be conspicuous by their absence, and certainly no attempt is made to explain the scientific reasons underlying some of the most common garden practices. The mere examination of the parts and tissues of a plant is not horticulture but botany, and some of the very best cultivators in the kingdom would find a difficulty perhaps in describing the plants they grow in strictly botanical language. If Mr. Webb had been trained as a gardener he would probably be in a better position to teach the "principles of horticulture," and to appreciate what gardeners, as gardeners, desire to know. But it is a mistake to think that the botanist pure and simple can ever hope to explain the numerous phenomena that gardeners are accustomed to meet with almost every day. It is true that "rule of thumb" methods obtain to a certain extent even in these days amongst some gardeners, who care little as to *why* they perform this operation or that; but their number is steadily decreasing. The intelligent gardener knows that all his practice is based on a solid scientific basis, and he therefore knows exactly why he drains his pots, mixes his composts, shades his cuttings, syringes his plants, ventilates his greenhouses or frames, and endeavours to maintain certain temperatures. These are important points that Mr. Webb would have done well to explain; as it is, he has, as we have already said, merely produced a conglomeration of elementary botany, entomology, and what is termed "nature study"—the present craze of many so-called educationists.

J. W.

BOOK-NOTES, NEWS, &c.

Mr. S. A Stewart, who resigned the curatorship of the Belfast Museum, in May last, has presented his herbarium and palæontological collection to that institution. At the annual meeting of the Belfast Natural History and Philosophical Society on Sep. 27th many tributes were paid to Mr. Stewart's work, especially in connection with the Belfast Naturalists' Field Club, of which he was one of the founders and on whose committee he served for forty years. Mr. Stewart's address is now 342, Springfield Road, Belfast.

Dr. J. Reynolds Green's *Introduction to Vegetable Physiology*, which was commended in this Journal on its first appearance in 1900, has passed into a second edition. The differences between this and the original issue are very slight, as but few changes were necessary. It is published by Messrs J. & A. Churchill, price 10s. 6d. net.

Flowering Trees and Shrubs, by Henry Hoare (Humphreys; price 7*s.* 6*d.*), is a handsomely printed little quarto volume containing a monthly calendar, a descriptive portion arranged alphabetically under the Latin names, and lists of trees and shrubs suited to various localities. It is illustrated with plates by Gertrude Hamilton, somewhat coarsely coloured, but occasionally —e. g. *Chimonanthus*—excellent. The descriptions are somewhat meagre and sometimes contain quaint remarks—*e. g.* it is said of *Cercis Siliquastrum*: "Some say that Judas hanged himself from one of its branches; but one prefers to connect no episode so painful with it"!

Prof. J. B. Farmer, of the Royal College of Science, has been appointed editor of the *Gardeners' Chronicle* in succession to the late Dr. Masters.

The recently published *Census Catalogue of British Mosses* (York: Coultas and Volans. 63 pp. Price 1*s.* 6*d.*, or 2*s.* interleaved), compiled by members of the Moss Exchange Club, is a valuable and useful addition to bryological literature. It provides an almost complete record of the distribution of each species and variety, and is the result of much patient research and careful revision. By means of a series of indicative numbers this distribution is recorded against each of the 619 species and their varieties throughout the 112 Watsonian vice-county divisions of Great Britain and R. Lloyd Praeger's 40 county divisons of Ireland. This record must prove of the greatest value to local collectors, as showing the ascertained flora of each division, and as revealing the districts which call for further investigation. Explanatory notes are supplied by Mr. W. Ingham and by Mr. H. N. Dixon, and are followed by a table of the county divisions with their reference numbers and their boundary limits. The very numerous sources from which the *Catalogue* has been compiled are duly set forth in detail, carefully arranged in a geographical sequence. This bibliography forms an almost exhaustive record of the very scattered papers on British bryology, and includes also references to many manuscript lists.—A. G.

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THE

JOURNAL OF BOTANY

BRITISH AND FOREIGN

EDITED BY

JAMES BRITTEN, K.S.G., F.L.S.

CONTENTS

	PAGE
The Germination of Poplars. By Florence H. Woolward. (Plate 487)	417
Notes on the Flora of the Channel Islands. By G. Claridge Druce, M.A., F.L.S. (concluded)	419
Notes on *Limonium*. By C. E. Salmon, F.L.S.	428
Notes on the "List of British Seed-Plants."—II. By A. B. Rendle, D.Sc., F.L.S., & James Britten, F.L.S.	433
Silene elongata Bellardi. By Robert Paulson, F.R.M.S.	445
Rubus mucronatoides. By the Rev. Augustin Ley, M.A.	446
Botanical Exchange Club Report, 1906.	447
Short Notes. — *Linaria arenaria* DC. not a Native.—*Polystichum Braunii* in England—*Lycopodium clavatum* L. in Bedfordshire.—*Ranunculus tripartitus* DC. — Ecology of *Montia fontana*.—*Potamogeton spathulæformis* Morong	451
Notice of Book:— Die Bedentung der Reinkultur. Von Dr. Oswald Richter	453
Book-Notes, News, &c.	454

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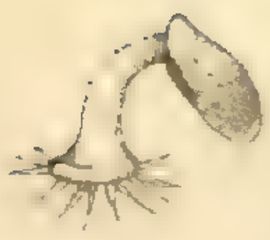

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Germination of Poplars.

THE GERMINATION OF POPLARS.

By Florence H. Woolward.

(Plate 487.)

The genial summer of 1906 is thought to have had a beneficial effect upon trees by maturing and strengthening their young growths, and this may, perhaps, partly account for the unusually large number of Poplars which ripened seed in 1907, although more unfavourable conditions for the diffusion of pollen than the wet cold spring of this year can hardly be imagined. The extreme rarity of Poplar-seeds in this country may be caused by the dicœcious character of the genus, for it frequently happens that trees of one sex are abundant in a district, while specimens of the opposite sex are entirely absent. In my experience pistillate trees are generally less common in England than staminate ones, another hindrance to the production of seeds. In natural forests and uncultivated land where the trees are indigenous, the distribution of the two forms would probably be more equal.

There is no doubt, however, that the marvellously fine powder of the pollen-grains is often carried by the wind to a great distance, for I am informed that the large pistillate tree of *Populus nigra* at New Ross, in Ireland, from the seeds of which I have raised young plants, is quite an isolated specimen, and a tree at Kew which ripened seeds abundantly this spring is stated to be a quarter of a mile from any other Poplar. Owing to miscellaneous planting, especially in botanic gardens, and the proximity of trees of different species, natural hybridization might frequently result, and in many cases the complete origin of seeds might be difficult to ascertain.

The first seeds which germinated under my care were from a tree growing in the Queen's Cottage ground at Kew, the flowers of which were developed early in April, and were sent to me under the name of *Populus nigra*. I recognized them, however, to be those of *P. monilifera* Ait., to the staminate form of which Moench, twenty-five years earlier, gave the name of *P. canadensis*; and an examination, later in the year, of leaves from the same tree confirmed my opinion. Without going into the vexed question of species, variety, or hybrid, or attempting to discuss synonymy, I shall in this paper refer to the tree as *P. canadensis*.

In June, specimens of the fruit were sent to me, and proved to contain fertile seeds, which ripened in a few days and were scattered about abundantly among masses of cottony down from the bursting capsules. The minuteness of the seeds of this species—and, indeed, of those of all Poplars—in proportion to the great size of a full-grown tree, is remarkable. The largest seed measures less than one-eighth inch in length, and staminate trees attain a height of 130 to 140 ft., and a girth of more than 18 ft., with fine spreading heads visible over the tops of all other trees in the neighbourhood. Specimens of *P. canadensis* as large as

this are abundant in Lincolnshire, and are not more than eighty or ninety years old. It seems probable that the pistillate form of this tree never attains so great a size, at any rate in this country. In shape the seeds are oblong-oval, the base blunt and porous, and the whole surface minutely tomentose with a few rather longer silky hairs, which apparently serve the purpose of absorbing moisture. In *P. canescens* the seeds are rounder and much more minute, and in *P. nigra* they are narrower and less rounded, but all are of the same dull whitish colour, and tomentose.

Germination is extremely rapid; after the seed has been freed from the cottony down enveloping it and soaked in water, the radicle appears in one or two days, and in the case of the seeds of *P. marilandica* from Kew, ten hours in water were sufficient to cause germination. Reference to the accompanying plate will explain the stages of growth from the seed to the young plant, complete figures being given of one species from the "White Poplar group" (*P. canescens*), and of one from the "Black Poplar group" (*P. canadensis*). The later stage of *P. nigra* and *P. marilandica* resembles, except in minor particulars, that of *P. canadensis*, and is omitted for want of space. A simple radicle with a short length of stem first protruded from most of the seeds, although some showed the cotyledons before the root. Those which developed a central root proved afterwards to be the strongest plants. On the second day a circle or fringe of delicate root-fibres appeared around the base of the stem, and when the young plant was placed upon damp sandy soil, these fibres immediately began to attract to themselves particles of sand and earth. In two days the testa was thrown off, and the minute fleshy cotyledons began to spread apart and to show a tinge of green, the stems becoming reddish. (For these stages of growth see figs. 1*b*, 2*b*, 3*a*, and 4*a*.)

After five or six days the cotyledons were well developed, flattened out laterally, and bright green. In shape they were orbicular, sagittate at the base, thick and succulent, glabrous, pale yellow at first, then bright green without the tinge of red so noticeable later in the leaves and stems. The central bud then grew rapidly, and in three weeks the first pair of leaves were half-an-inch long. Those of *P. canadensis*, *P. nigra*, and *P. marilandica* were linear-oblong, toothed at the margin—the teeth placed at a much greater distance apart than in the second and third pairs of leaves later developed—the horny incurved tip of each tooth so remarkable in full-grown leaves of these species being distinctly visible, and the whole plant glabrous. In later stages of growth these characteristics were maintained, but the upper leaves of all species gradually became broader, although they were far from resembling in shape those of a full-grown tree.

Later growth and development were less rapid, for, about four months after germination, the largest of the young plants (*P. canadensis*) were only two inches high, although in a flourishing condition, and with three pairs of leaves about one and a quarter

inch long. The stems were woody throughout the three lowest joints, dark red, with a strong terminal bud, and the cotyledons quite withered away. There was no trace of lateral compression of the petioles in the seedling stage.

Young plants of *P. marilandica*, although shorter than those of *P. canadensis*, had much larger leaves, tinged throughout with red, the upper part of the stem being minutely hairy, with strongly marked lenticels.

P. nigra was of slower growth and smaller in all particulars; the stem was minutely pilose.

P. canescens showed a robust, wide-spreading habit; the leaves flat and broad, each pair at right angles with the next pair; the stem short and stout—all dull green.

I have this summer raised seedlings of Poplars from widely separated localities, and append a list of the species, as follows:—*P. canescens*, from Colesborne, Gloucestershire; *P. nigra*, from New Ross in Ireland (from an old tree 20 ft. in girth), Bury St. Edmunds, and Bourton-on-the-Water, Gloucestershire; *P. canadensis* and *P. marilandica*, from the Royal Gardens, Kew.

Explanation of Plate 487.

Fig. 1. *Populus canescens*, young plant, × 2. 1 *a*. Seed, enlarged and nat. size. 1 *b*. Seed germinating, and young cotyledons, × 2.

Fig. 2. *P. canadensis*, young plant, × 2. 2 *a*. Seed enlarged and nat. size. 2 *b*. Seeds germinating, and cotyledons, × 2.

Fig. 3. Seed of *P. marilandica* enlarged and nat. size. 3 *a*. Seed germinating, and young cotyledons, × 2.

Fig. 4. Seed of *P. nigra* enlarged and nat. size. 4 *a*. Seed germinating, and cotyledons, × 2.

NOTES ON THE FLORA OF THE CHANNEL ISLANDS.

By G. Claridge Druce, M.A., F.L.S.

(Concluded from p. 402.)

Ulex Gallii Planch. †var. *humilis* Planch. Plentiful on the downs between Grosnez and L'Etac, Jersey.

Cytisus scoparius Link †var. *prostratus* (Bailey). Common and typical on the rocks near L'Etac, Jersey. On the Sark cliffs a small but not prostrate form was observed.

Ononis reclinata L. I was rather too late in July for this plant in Alderney, but a few plants still showed a flower. On the dunes in Longy Bay it was dwarfed to less than an inch.

Medicago sativa L. On West Mount, Jersey, with yellow flowers. Not native.—*M. lupulina* L. †var. *Willdenowiana* Koch. Alderney. — *M. minima* L. West Mount, Jersey. It is very curious to find that no *Medicago* is recorded for Sark.

Trifolium hybridum L. Naturalized at Bel Royal, Jersey.—*T. glomeratum* L. Particularly luxuriant in the beds of quarries near Vale, Guernsey, some specimens being over a yard across;

it is also luxuriant in Alderney. — *T. procumbens* L. †var. *majus* Koch. Plentiful in Sark; this is probably the *T. agrarium* recorded by Miller. The Sark plant is probably *T. campestre* Schreber.

Anthyllis Vulneraria L. †var. *ochroleuca* (Corb.). On the cliffs of Fiquet Bay. The large terminal leaflet and the pale yellow flowers distinguish it. In Alderney a form with quite simple leaves occurred, but it was only the first season's growth.

Lotus corniculatus L. var. *crassifolius* Pers. On the Quenvais, Jersey, and L'Ancresse, Guernsey; the flowers often tipped with red.—*L. angustissimus* L. Beauport, &c., Jersey; Vale, Guernsey. —*L. hispidus* Desf. Vale, Guernsey; very luxuriant.—*L. uliginosus* Schkuhr. The very hairy form near Creux, Sark.

Ornithopus pinnatus (Mill.). Still plentiful on L'Ancresse, Guernsey.

Vicia hirsuta Gray. Bel Royal, Jersey. — †Var. *angustifolia* Druce. L'Erée, Guernsey. — *V. tetrasperma* Moench. Mont Orgueil, Jersey.—*V. lutea* L. Still at Mont Orgueil, where it was found by Mr. Guiton.—*V. sativa* L. †var. *canescens* mihi. Leaves and stems covered with a dense greyish pubescence, so as to give a hoary appearance to the plant. Growing among turf. Bouley Bay, Jersey. — *V. angustifolia* L. †var. *Garlandii* mihi. Flowers nearly as large again as the ordinary form, with a more open corolla, and larger and more conspicuous standard of a bright rose purple; it is referred to in Mr. Lester-Garland's *Flora of Jersey*, and is sufficiently distinct to be worth a name. The plant occurs along the coast at St. Catherine's Bay and elsewhere in Jersey.— Var. *Bobartii* (Forst.). Sark. Grande Mare, Guernsey.

Rubus. I was too early to obtain satisfactory specimens for critical discrimination; the Rev. W. Moyle Rogers has kindly named the following, which were gathered in 1906:—

R. affinis var. *Briggsianus* Rogers. Corbiere, Jersey. — *R. argentatus* P. J. Muell. Plemont, Jersey.—†*R. Lindleianus* Lees. In several places in Jersey. — †*R. rusticanus* Merc. New to Alderney; Sark.—†*R. leucostachys* Schleich. New to Alderney; also at St. Andrew's, &c.; and a hybrid perhaps with *rusticanus* at Vazon, Guernsey.—*R. Sprengelii* Weihe. St. Helier's, Jersey, with unusually strong stem-prickles.—*R. Borœanus* Génév. Bouley Bay, Jersey; also as a lax-panicled plant at Grosnez. A bramble which was not uncommon in the Waterworks Valley, Jersey, Mr. Rogers says is near to *R. leucostachys* and *R. Borœanus*.—*R. macrophyllus* W. & N. var. *macrophylloides* Génév. Sark; very luxuriant. — *R. robustus* P. J. Muell. St. Peter's Barracks, Guernsey.—*R. rhamnifolius* W. & N. agg. Portelet, St. Aubin's, Jersey. — †*R. rusticanus* × *cæsius*. Bouley Bay, Jersey. — †*R. anglicanus* W. M. R. Grosnez, Jersey.—†*R. dumetorum* W. & N. Gorey, Jersey.—†*R.* ?. Gorey Bay, Jersey. Mr. Rogers says this is identical with my "Norgiots, St. Andrew's, Guernsey," plant, thought by Focke to be near to *argyranthus* Boul. & Luc. It seems somewhat intermediate between *R. leucostachys* and *R. Borœanus*, but so as to go as a variety under the former. In the

Flora of Guernsey the plant from Les Norgiots is referred to *R. leucostachys* var. *angustifolius*, but that variety is now placed under *R. lasioclados*.

Potentilla reptans L. †var. *microphylla* Tratt. On the Quenvais, Jersey.—*P. procumbens* Sibth. Trinity, Jersey.

Poterium polygamum Waldst. & Kit. West Mount, Jersey.

Rosa Eglanteria L. Pont Marquet, Jersey. — *R. lutetiana* Léman. Beauport, Jersey.—*R. dumetorum* Thuill. Beauport, Jersey. — **R. tomentella* Léman. Near Pont Marquet, Jersey.— †*R. spinosissima* L. On the Quenvais in several places occurred a beautiful form with pink flowers.

Cratægus Oxyacantha L. = *monogyna* was alone noticed in the islands.

Pyrus Malus L. Said to be very rare, only two localities being given in the *Flora of Jersey*. I saw it in a hedge near Grosnez, and a bush in a hedge near Pont Marquet.—*P. germanica* Hook. f. The spinous form in the Waterworks Valley, Jersey.

Callitriche stagnalis Scop. L'Etac alone given in the *Flora*; I saw it at St. Catherine's, Trinity, and Grosnez, and near Longy, Alderney. — *C. obtusangula* Le Gall. Still at Bellozanne, Jersey, where I saw it in 1877. Also at Paradis, in Guernsey.

Œnothera odorata Jacq. Abundant along St. Aubin's Bay, and spreading inland along the railway, where it is very abundant between St. Aubin's and Don Bridge, Jersey. Mr. Lester-Garland queries it as being synonymous with *Œ. stricta* Lindeb.—*Œ. biennis* L. The larger pale-flowered *Œnothera* is quite naturalized in Jersey, as at St. Helier's, &c.

Epilobium tetragonum × *obscurum*. × *E. thuringiacum* Haussk. St. Aubin's, Jersey.—*E. parviflorum* Schreb. Waterworks Valley, Jersey. — *E. lanceolatum* Seb. & Maur. Rather frequent; a very pretty form occurred at St. Aubin's, Jersey, and a broad-leaved form suggesting the presence of *obscurum*, which was growing near, was seen at St. Martin's, Guernsey. — *E. obscurum* Schreb. Waterworks Valley, Jersey; and as †*strictifolia* Moulin, Huet, in Guernsey.

Sedum reflexum L. Looking native on rocks at the West Mount, Jersey.

Conium maculatum L. St. Ouen's Bay, Jersey.

Bupleurum aristatum Bartl. Locally common on St. Ouen's Bay, and on the Quenvais, where it was scarcer and less luxuriant, being indeed the var. *nanum* (Koch). Also on the sand-dunes at Longy Bay, Alderney.

Carum Petroselinum Benth. & Hook. f. Quite wild-looking by the road near Corbiere, Jersey.

Æthusa Cynapium L. Corbiere, Jersey; rare.

Caucalis Anthriscus Huds. Corblets, Alderney. A confirmation of its record in the *Flora Sarnicæ*.

Rubia peregrina L. Still holds its own in its solitary locality in Alderney; in Jersey at Beauport, and Corbiere.

Gunnera chilensis Lam. Moulin Huet, in luxuriant growth, Guernsey.

Galium palustre L. As a plant about eighteen inches high, gathered at Beaumont, Jersey; has very narrow leaves, few-flowered dense cymes of small flowers, does not come under any of our named forms; to this may also belong a very narrow-leaved dwarf plant which occurred in damp places near Paradis, Guernsey. —Var. *Witheringii* (Sm.). St. Ouen's, Jersey.—*G. verum* L. var. *maritimum* DC. Common on the dunes at St. Ouen's, &c., at L'Ancresse, Guernsey, and at Longy, &c., Alderney.—*G. verum* × *Mollugo*. This hybrid was noticed in the road leading from St. Aubin's to Portelet; it is nearer *verum*, and at St. Ouen's, Jersey, also as a plant nearer to *Mollugo* at Vale, Guernsey, where the habit was much like *Mollugo*, and the plant did not blacken in drying, but the flowers were distinctly yellow.

Sherardia arvensis L. †var. *maritima* Griseb. Near St. Helier's, Jersey.

Kentranthus ruber DC. Abundant about St. Helier's, &c., in three distinct colours—dark red, pinkish-purple, the normal tint, and white.

Valerianella carinata Loisel. Common in Jersey; and Guernsey.—*V. eriocarpa* Desv. Growing on the rocks by the road near St. Peter's Barracks, Mont à la Brune, Jersey.

Gnaphalium undulatum L. I saw this South African species growing among *Pteris* on the slope of Portelet Bay, Jersey; quite naturalized.

Filago gallica L. In the locality in which Mr. Hurst discovered it near Vallette, Sark, growing in some quantity.

Inula Helenium L. Near L'Erée, by a house, Guernsey.—*I. crithmoides* L. Near Grosnez Castle, Jersey.

Matricaria inodora L. As Mr. Lester-Garland says, the maritime form var. *salina* Bab. is a very distinct-looking plant. It is very abundant round St. Aubin's Bay, and also at the Corbiere Rocks, Jersey; it also occurs at Vale, Guernsey. The stem is quite woody, and the thick clusters of the old leaves at the base of the stem give it quite a characteristic appearance. Probably it is the *M. maritima* of the *Flore de Normandie*; writing of this plant, Corbiere says: "Les graines, semées en terre ordinaire par M. Lloyd, lui ont donné, dès la première année, le *M. inodora* de l'intérieur." I looked out rather carefully for transition forms, but did not see them.

Diotis maritima Hook. The locality where I saw this growing in Jersey in 1877 is now covered by the St. Ouen's sea-wall. It appears now extinct in the islands.

†*Senecio Cineraria* DC. On the steep bank of a road near St. Aubin's, where it has escaped from a garden, but will soon be naturalized.

Cirsium lanceolatum Scop. †var. *hypoleucum* DC. A pretty form, with leaves very hairy above and covered with a whitish tomentum below, occurred at Millbrook, Jersey.—*C. arvense* Scop. †var. *horridum*. St. Catherine's Bay, Jersey. — Var. *mite* (Koch). Pont Marquet, Jersey; Vale, Guernsey.

Centaurea nigra L. At St. Ouen's this occurred as a plant

with large rayed heads and dark brown strongly fringed phyllaries, which seems to be the †*C. pratensis* Thuill. of the *Flore de Normandie*. — *C. paniculata* L. Still in the same locality at St. Ouen's, where I saw it in 1877; this year it was much dwarfed by the drought. — *C. aspera* L. Abundant at St. Ouen's, and I think native; some of the capitula had yellowish-white flowers. Also at Vazon Bay, Guernsey, and in Alderney. — *C. Cyanus* L. On the walls at St. Peter's Port, Guernsey; St. Aubin's, Jersey.

Cichorium Intybus L. St. Martin's, Jersey.

Hypochæris glabra L. Bel Royal, Don Bridge, &c., Jersey.— *H. radicata* L. Still near Grosnez; it was in beautiful flower.— †Var. *hispida* Peterm. St. Helier's; Alderney.

Picris hieracioides L. †var. *incana* mihi. Between the town and Longy Bay by the roadside in considerable quantity. This occurred as a well-marked variety with narrow leaves deeply and unevenly cut, with densely aggregated capitula, the centre ones being much overtopped by the lateral ones. The outer phyllaries covered with a short greyish-white tomentum, resembling that of *Crepis taraxacifolia*.—†Var. *arvalis* (Jord.). Near Pont Marquet, Jersey.

Leontodon hispidus L. Babington says it is common in the Channel Isles, but neither Mr. Lester-Garland nor I was able to find this in the islands.—*L. nudicaulis* (L.) ? Mérat (*L. hirtum* L.). Very common in Jersey and Guernsey, and very variable.— †Var. *arenaria* (DC.) (sub *Thrincia hirta*). A more glabrous and much branching plant, with strong tap-root and leaves sinuately cut, with hairy phyllaries, grows in the sands at St. Helier's and St. Aubin's, Jersey; near Vazon, Guernsey; and at Longy Bay, Alderney.—†Var. *pristis* mihi. This is a densely-hispidly hairy, subsimple plant, with strong tap-root, the leaves deeply repand-runcinate and covered with long shaggy hairs at the base. The phyllaries are subglabrous. I saw this at Vale, Guernsey, and at Longy Bay, Alderney. I think it is the *L. hispidus* of Babington, but the fruit-characters agree with *Thrincia*. The plant looks specifically distinct from *nudicaulis*. The name is given from the leaf-cutting suggestive of the saw-fish. Another plant with long narrow, nearly entire, leaves and glabrous phyllaries, which grew at Vale, Guernsey, is the †var. *leiolæna* (Bisch.).

Sonchus asper Hill var. *runcinatus*. Mont Orgeuil, Jersey.

Crepis capillaris Wallr. A form of this plant was plentiful by St. Aubin's Bay, and on the Quenvais, Jersey, and also in Alderney, which had a strong tap-root, with numerous flowers of a deep yellow colour, the outer ligules being tipped with red; the plants from four to six inches high.

Tragopogon porrifolius L. Near the harbour, Alderney, quite naturalized, and fruiting freely. Casual at St. Luke's, Jersey.

†*Symphytum asperum* Lepechin (*asperrimum* Donn), the fodder plant. I saw it at St. Catherine's and St. Brelade's, Jersey.

Anchusa sempervirens L. St. Aubin's, &c. Apparently native in Jersey.

Myosotis scorpioides L. (= *M. arvensis* Lam.). Pont Marquet,

Jersey. *M. repens* Don appears the commoner plant; I saw it in all the islands.

Echium plantagineum L. In most beautiful flower on West Mount, &c. On the slope of a hill near Beauport there were some hundreds of a tall fasciated form three to four feet high; in one instance at least the flattened stem was ten inches across, and had on it 438 fully expanded flowers. The plants attracted my attention more than a mile away.

†*Statice maritima* Mill. This holotrichous plant was common on the north coast of Guernsey, at Grosnez in Jersey, at Alderney and Sark.—*S. plantaginea* All. Very abundant over the Quenvais and St. Ouen's Bay, and much increased in quantity since my last visit. I saw nothing of the supposed hybrid mentioned by Syme, but I did not search his locality with care; I believe it was only a form of *S. plantaginea*, which varies at St. Ouen's very much in stature and size which Mr. Lester-Garland drew my attention to, a marked form (†var. *bracteata* mihi), with long bracts from 1 to 1½ in. long, giving a very curious appearance to the plant. Naturally there are transition forms, but plants answering the above descriptions are quite common, and especially noticeable before flowering.

Limonium lychnidifolium O. Kuntze. I saw this coming into flower in the classic locality.—*L. binervosum* C. E. Salmon. Beauport, Jersey.

Verbascum virgatum Stokes. Near Vazon, but not typical.—*V. nigrum* L. Corbiere, Jersey.

Veronica Anagallis-aquatica L. A small glabrous form with pale flowers at La Moye, Jersey.—*V. agrestis* L. A form with white flowers, the three upper petals tinged with pink, as described by Mr. Marquand, is frequent in Guernsey.

Scrophularia Scorodonia L. Common, not only "in hedges and thickets," but on banks and walls, Jersey.

†*Rhinanthus stenophyllus* Schur. Near Grande Mare, Guernsey.—*R. Crista-galli* L. is the common form in the islands.

Bartsia Odontites L. var. *verna* (Reichb.). Grande Mare, Guernsey.—*B. viscosa* L. Not unfrequent, Corbiere, Jersey.

Euphrasia curta Fries var. *glabrescens* Wettst. In all the islands; plentiful at Longy, Alderney; on the Quenvais, Jersey; and at L'Ancresse, Guernsey; and in Sark.—*E. occidentalis* Wettst. Alderney; Sark.—†*E. nemorosa* H. Mart. Sark.

Orobanche purpurea Jacq. I think to this must be referred the blue *Orobanche* of Jersey, where I saw it on West Mount, abundantly near Pont Marquet, at Beaumont, L'Etac, and St. Ouen's, Jersey; and also abundantly in Alderney. In both islands the modifications with many stems springing from the same root occurred.—*O. minor* Sm. Mont Orgueil, Beauport, L'Etac, Jersey.—*O. amethystea* Thuill. Very characteristic at Braye Bay, Alderney, growing on *Eryngium*, and sometimes thirty-three inches high. St. Catherine's Bay, Jersey. Passed by Dr. G. Beck.—*O. Hederæ* Duby. On the cliffs near the harbour, Sark, a form with nearly white flowers and stem grew on ivy, which

Dr. G. Beck says is only a luxuriant form.—†*O. Ritro* Gren. & Godr. forma *hypochæroides* Beck *in lit.* On the sands of St. Ouen's Bay Mr. Lester-Garland showed me a very beautiful species growing on *Hypochæris radicata.* It was of a bright citron-yellow colour, not only in the flowers, but also the bracts and stem. The older bracts were marked at the midrib with bright yellowish-brown. The curiously conical head of the partially open-flowered spikes was also remarkable. The plant was very glandular. The type has only been found in a few localities near Marseilles. The existence of another undoubtedly native Mediterranean species in the island is very interesting.

Marrubium vulgare L. Grosnez and L'Etac, Jersey.

Melissa officinalis L. St. Ouen's, but near a house, Jersey.

**Stachys ambigua* Sm. Moulm Huet, Guernsey.

†*Galeopsis Ladanum* L. Near Pont Marquet. New to the island, but only a solitary specimen, and probably casual.

Salvia Verbenaca L. In Jersey, Alderney, and Guernsey, common, but offering little variation in character, except such as arises from differing conditions of more or less nutrition and greater or less exposure.—*S. Marquandii* Druce. Vazon Bay, Guernsey; see Journ. Bot. 1906, 405.

†*Thymus Chamædrys* Fries. Between Pont Marquet and St. Brelade's I saw a few plants which I think must be referred to the above, of which it had the habit, the small flowers, and also a character which Corbiere considers to be specific: *viz.*, in *T. Serpyllum* the branches are hairy all round; in *T. Chamædrys* the hairs are arranged in two or four lines only.

Plantago maritima L. †var. *latifolia.* Grosnez.—*P. lanceolata* L. †var. *sphærostachya* Roehl. Quenvais, Jersey; L'Ancresse, Guernsey; Longy, Alderney; Sark.—*P. Coronopus* L. forma *pinnatifida* Wirtg. St. Helier's, Jersey.

Chenopodium album L. †var. *microphyllum* Coss. & Germ. Sark.—Var. *candicans* (Lam.). Bel Royal, Jersey.—*C. ficifolium* Sm.† Braye; not recorded for Alderney in the Guernsey *Flora.* Common in Guernsey.—†*C. opulifolium* Schrad. Vale, Guernsey; Braye, Alderney. New to the islands.—*C. glaucum* L. Only once reported from Guernsey by Mr. H. C. Watson, who found it at St. Sampson's, where it had not again been found. I saw it between St. Peter's and St. Martin's.

Salicornia herbacea L. †var. *stricta* (Dum.). Near Cobo, Guernsey.—**S. ramosissima* Woods. St. Helier's, Jersey.

Atriplex Halimus L. Beauport, Jersey.—†*A. hortensis* L. var. *rubra* Moq. By the railway near Bel Royal, Jersey; casual.

Polygonum Convolvulus L. var. *alatum* Van Hall. Vale, Guernsey.—*P. aviculare* L. var. *agrestinum* (Jord.). L'Etac, Jersey.

†*Rumex sanguineus* L. St. Aubin's, Jersey, but probably not native; it appears to be native at Vale, &c., Guernsey.—*R. pulcher* L. A red-veined form at St. Aubin's, Jersey.

Humulus Lupulus L. La Haule, Gorey, Jersey.

†*Ulmus stricta* Lindl. St. Helier's, &c., not unfrequent, but

almost certainly planted in Jersey; scattered also through Guernsey.

Thesium humifusum DC. Near Don Bridge. Mr. Piquet had only once seen it in Jersey. Rather frequent at Longy Bay, Alderney.

Asparagus officinalis L. var. *altilis* L. St. Ouen's as a stray, Jersey.

**Orchis ericetorum* Linton. Grande Mare, Guernsey; *La Hoye, Jersey.

Potamogeton natans L. Very rare in Jersey. I saw it in the Waterworks Pond.—*P. polygonifolius* Pourr. Grosnez, as the †var. *ericetorum*.—†*P. interruptus* Kit. St. Ouen's Pond.

Zannichellia pedunculata Reichb. L'Ancresse, Guernsey.

Carex flava L. †var. *minor* Towns. Grosnez; Bouley Bay, Jersey. —*C. binervis* Sm. Heathland near Grosnez, Jersey.—*C. muricata* L. (= *contigua* Hoppe). Near Portelet, Jersey.—*C. Goodenowii* Gay var. *chlorocarpa* (Reichb.). St. Ouen's Bay, Jersey.—†Var. *recta* (Kukenthal). St. Ouen's Bay; Grande Mare, Guernsey.

Scirpus pauciflorus Lightf. St. Ouen's Bay; new to Jersey.—*S. fluitans* and *Eleocharis multicaulis* Br. St. Ouen's Bay, Jersey.

Juncus bulbosus L. Near Grosnez, Jersey—*J. acutiflorus* Ehrh. (= *J. sylvaticus* Reichb.). Waterworks Valley, Jersey.—*J. inflexus* L. (*glaucus* Ehrh.). Near St. Brelade's, Jersey.

Phleum pratense L. At Bel Royal; rare in Jersey.

Phalaris minor Retz. Abundant in cultivated land at St. Luke's, Jersey, and in many parts of Guernsey; but it appears to be a colonist rather than a native.

†*Agrostis verticillata* Vill. On newly made ground near St. Luke's, Jersey. On disturbed soil near Braye, Alderney. Abundantly, not only on quarry *débris*, but by roadsides, &c., at Vale, St. Sampson's, and near the Grande Mare, Guernsey, This Mediterranean species, which has for nearly a century been known at Cherbourg, is well naturalized, if not native, in Guernsey. It is easily known from *A. alba* L. var. *stolonifera* (L.), which it somewhat resembles, by the panicle branches being garnished with spikelets to their base, not naked as in *A. alba*. New to the islands.—*A. alba* L. var. *maritima* Meyer. St. Helier's, Jersey; Cobo, &c., Guernsey; Longy, Alderney.—*A. tenuis* Sibth. (*vulgaris* With.) var. *humilis*. Heathland near Grosnez, Jersey; L'Ancresse, Guernsey.

Polypogon monspeliense L. The locality at St. Sampson's, where I saw this and *Suæda fruticosa* twenty-seven years ago, is now covered with glass-houses.

Gastridium lendigerum Gaud. Near Vallette, Sark.

Lagurus ovatus L. In 1877 Mr. Piquet showed me a small patch, which could have been covered with a handkerchief, resulting from some seeds which he sowed there one or two years before. Now the plant has spread over the whole of St. Ouen's Bay, and even some little distance inland on the sand-dunes.

Trisetum pratense Pers. †var. *variegatum* (M. & K.). Braye, Alderney.

Avena fatua L. †var. *glabrata* Peterm. St. Luke's, Jersey.—

A. pubescens Huds. Rare; on the slopes of Beauport, Jersey, with *Anthyllis*, another Calcipete.

Arrhenatherum avenaceum Beauv. var. *tuberosum* (Gilib.). St. Ouen's, Don Bridge, Jersey. Common in Guernsey, where I did not see the type. †Sark: not recorded for this island; I saw it in several places.

Cynodon Dactylon Pers. Still at Vazon, Guernsey.

Phragmites communis Trin. var. *stolonifera* Meyer. Paradis, Guernsey; Portelet Bay, Jersey.—Var. *subuniflora* (DC.). Grande Mare, Guernsey; St. Ouen's, Jersey.

Holcus lanatus L. †var. *albovirens* Reichb. Bel Royal, Jersey; Alderney.

Briza maxima L. Pont Marquet, Jersey; not native.—*B. minor* L. Very beautiful in Sark.—†*B. media* L. In a rich meadow, Grande Mare, Guernsey; new to the island.

Dactylis glomerata L. †var. *abbreviata* Bernh. Quenvais, Jersey; L'Ancresse, Guernsey; Longy, Alderney.—†Var. *glauca*. A strongly glaucous form at Portelet, Jersey.

Cynosurus echinatus L. Varying much in frequency in different years. I was unable to find it in 1877. This year it was in great abundance, and very luxuriant, on West Mount, Jersey, and in several places about Vale, Guernsey, where it was shown me by Mr. Marquand.

Poa annua L. †var. *picta* Beck. St. Ouen's, Jersey. A very tall, lax form at the Grande Mare, Guernsey. A very minute form in fruit at Petit Bot Bay, Guernsey.—*P. subcærulea* Sm. Quenvais, &c., Jersey; L'Ancresse, Guernsey; Longy, Alderney; near the harbour, Sark.—*P. trivialis* L. †var. *glabra* Doell. West Mount, Jersey.

Kœleria. The large series I collected of this genus in the Channel Isles await determination. *K. albescens* DC. was abundant on the Quenvais, Jersey.

Glyceria fluitans R. Br. †var. *triticea* Fr. St. Ouen's Pond, Jersey.—*G. distans* Wahl. St. Luke's, Jersey; a recent addition to the island, found by the Rev. W. Moyle Rogers in 1897, at George Town.

Festuca bromoides L. (*F. sciuroides* Roth). An upright and as a prostrate form at St. Helier's, Jersey, where it was sometimes very luxuriant. As a dwarf prostrate form in Sark.—†Var. *intermedia* (Hackel). St. Aubin's, Jersey.—*F. membranacea* (L.) Druce. Common and luxuriant on the mobile sands of St. Ouen's, Jersey; Cobo, &c., Guernsey; and Longy, Alderney.—*F. ambigua* Le Gall. The Quenvais in two or three places, and Bel Royal, Jersey. Nearly burned up, so probably commoner than it appeared. There is only one previous record, that by Mr. T. B. Blow in 1876. L'Ancresse, Guernsey; Braye and Corblets, Alderney.—*F. rigida* Kunth. Bel Royal, Jersey.—*F. ovina* L. †var. *duriuscula* Koch. Very abundant on the Creux Rocks, Sark.—Var. *tenuifolia* (Sibth.) = *paludosa* Gaud. Grosnez, Quenvais, &c., Jersey. Sometimes very glaucous. Common in several places in Guernsey, and also seen in Sark.—*F. rubra* L. var. *juncea* Hackel. Magnificent specimens on the mobile sands on the slopes above

St. Ouen's Bay, Jersey. Less typical in Alderney.—Var. *vulgaris*. Common in all the islands, and as a form approaching *juncea* in Sark; West Mount, Jersey; and Alderney. — *F. arundinacea* Schreb. St. Ouen's, Jersey; Grande Mare, Guernsey.

Bromus rigidus Roth. In fine condition near the Creux Rocks, Sark, where it was found by Mr. J. W. White.—*B. rigens* L. (= *B. maximus* Desv.). Common in many localities, as at Bel Royal, Jersey; Vale, &c., Guernsey; Braye, Alderney, in magnificent growth.—*B. hordeaceus* L. (= *mollis* L.). Common and variable; a very robust form, with large spikelets, at Millbrook, Jersey.—†Var. *Thomini* (Bréb.). On the Quenvais, Jersey; on L'Ancresse, Guernsey; and at Longy, Alderney.—*B. commutatus* Schrad. Grande Mare, Guernsey; St. Helier's, Jersey; near Vallette. †New to Sark. A pubescent form was seen near the Grande Mare.

Brachypodium sylvaticum Roem. & Schult. Common about Grosnez Castle, Jersey.

Lolium multiflorum Lam. Millbrook, Jersey; Vale, Guernsey. Not native.

Agropyron repens Beauv. †var. *Leersianum* S. F. Gray. Braye, Alderney. — †Var. *cæsium* Presl. St. Luke's, Jersey. — †Var. *Vaillantianum* Schrank. Braye Bay, Alderney. — †**A. Hackelii* mihi = *A. repens* × *junceum*. A common hybrid round the coasts of all the islands except Sark, and variable. At Cobo as a dwarfed form, but at the Grand Havre occurring as a form with large wheat-like spikes, which Prof. Hackel has named forma *cristata*. This hybrid is doubtless the *A. acutum* of the Floras.—*A. junceum* Beauv. Common on the mobile sands of the coast.—*A. pungens* Roem. & Schult. As a small strict form at Vazon Bay, Guernsey; as a very robust form at Perelle Bay, Guernsey; and as a very strict form with much of the aspect of × *Hackelii*, near Don Bridge, Jersey. This species is new to Jersey.

†*Hordeum nodosum* L. In a field near Perelle Bay, Guernsey. New to the Channel Isles. Native.

Lepturus filiformis Trin. As a prostrate plant with ascending culm at Vale, Guernsey; and as a slender upright plant at St. Luke's, Jersey, and the Grande Mare, Guernsey.

†*Pinus Pinaster* Ait. Planted near Beauport, Jersey.

Athyrium Filix-fœmina Roth †var. *convexum* (Newm.). Pont Marquet, Jersey.

NOTES ON *LIMONIUM*.

By C. E. Salmon, F.L.S.

VI.—Limonium bellidifolium Dum.

This sea lavender is the last of our British species to be dealt with, the other four having been described in former papers.* It seems to have been first noticed in England by Mr. H. Scott in

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* See Journ. Bot. 1903, 65; 1904, 361; 1905, 5 and 54; 1907, 24.

Norfolk about 1746 (Blackst. Spec. 47), and a little later in Lincolnshire by Sir J. Banks; and the plant was at first confused with the *Statice reticulata* of Linnæus, Sp. Pl. 275 (1753).

Under this specific name, but in the genus *Limonium*, Miller (Gard. Dict. ed. 8, 1768) mentions the discovery, and states that it also "grows naturally in Sicily," the inference being that he refers to the *S. reticulata* L. To show the confusion of species then existing, the specimen illustrating Miller's plant in his own herbarium is the endemic Spanish *S. dichotoma* Cav.

In the old British Floras, and in the early editions of Babington's *Manual*, our plant appears as *S. reticulata* L., but in Ann. Mag. Nat. Hist. 441 (1849), Babington pointed out that Boissier, in DC. Prodr. xii. 656, considered the Linnean plant to be probably identical with *S. cancellata* Bernh., but had rejected the name, as it had been confused with so many species. With this Babington concurred, and, following Boissier, identified our British plant with the *S. caspia** of Willdenow.

We may dismiss for the present *S. reticulata* L., and continue the line of research at the point where Babington left the matter. By the kindness of the Berlin Museum authorities I have seen the type specimens† of Willdenow's *S. caspia* and compared them with his original description in Enum. Hort. Bot. Berol. 336 (1809), which runs: "Foliis spathulatis obtusis subretusis, scapo erecto ramosissimo scabro, ramis sterilibus pectinatim ramosis, floribus confertissimis, bracteis membranaceis diaphanis."

Mention is made here, also, that the species is synonymous with the "*S. reticulata* M. Bieb. Fl. Taur.-Caucas. i. 250 (1808) (non Linn. nec Bocc.)," a view which M. Bieberstein himself adopts (iii. 253, 1819), where he replaces "*reticulata*" by *S. caspia* Willd.

The description given above may well apply, as indeed the specimens themselves show, to our British plant, with the exception of "foliis . . . subretusis"; but, as Babington (*l. c.* 443) has pointed out, this character may have originated in the apex of the leaf being strongly recurved, as sometimes happens, and I have little doubt that the conclusion arrived at by Babington as regards the correct place for our plant was correct.

Prior to the date of Willdenow's *S. caspia*, our plant was observed by Gouan in the district of Montpellier, South France, and described by him (Fl. Monspel. 231, 1765) as a variety of *S. Limonium*: "γ foliis obovatis. *Bellidifolia.*" The description is brief, but a reference given, "Mag. Bot. 155, hort. 119," enabled Grenier & Godron (Fl. Fr. ii. 749, 1850) to prove that Gouan's plant was undoubtedly the species under discussion. Gouan's herbarium, at Kew, contains no specimens of this plant that may be regarded as "type."

De Candolle (Fl. Fr. iii. 421, 1805) appears to be the first author who described our plant as a species, *S. bellidifolia*; I have seen

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* This is sometimes found erroneously written "*caspica* Willd.," and indeed is so spelt in his own herbarium.

† The cover contains five sheets. Nos. 1–3 and 5 are *S. caspia*; No. 4 is *S. decipiens* Ledeb.

authentic examples so named by him. Dumortier (Fl. Belgica, 27, 1827) seems to have first placed De Candolle's plant under the genus *Limonium*; we should therefore label specimens *L. bellidifolium* Dum.

The European distribution of our plant, as given by Nyman (Conspec. Fl. Europ. 1878-82, and Supp. 1890), includes Spain (Catalonia), Balearic Isles, South France, Italy, Sardinia, Austria-Hungary (Dalmatia), Turkey (Macedonia), Rumelia (Thracia), Rumania (Dobrudscha), Greece and South Russia; he separates our British plant as an endemic subspecies, "*S. reticulata* Sm.," found only in Norfolk and Lincoln.

To find a reason why Nyman should so label our form, I examined numerous examples of the species from all the countries mentioned above (with the exception of Rumelia and the Balearic Isles), and the results were as follows. In Spain, France, Italy, Sardinia, Austria-Hungary, Turkey, and Rumania the plant is usually identical with our native species, varying greatly, as in England, as regards barren branches, laxity of spike, &c.

In Greece and Russia the plant very often assumes a different aspect, and bears short dense spikes of smaller flowers with more rounded calyx-lobes (indeed Halacsy, Conspec. Fl. Græc. iii. 22, 1904, describes them as ovate), and is thus (particularly in Greece) nearer to the *S. Iconia* of Boissier & Heldreich. The latter, however, a rare plant of Asia Minor, has a different habit of growth, a distinctive hairy and small calyx, and other points of divergence. In Greece and Russia one finds that a very great variety of forms exist, which provide links between the extreme state mentioned and our English plant, and I am led to the conclusion that British examples, whilst often possessing larger flowers than those from the Continent (possibly caused by a difference in latitude), cannot be held to be a separate subspecies, as noted by Nyman, but are merely states or forms of this variable species.

A few examples of the varying nature of *L. bellidifolium* may not be out of place here:—*Wells, England*—very few or no sterile branches, spikes short dense; *Hunstanton, England*—numerous sterile branches with similar spikes; *Spain*—sterile branches many, spikes lax; *South France*—sterile branches many or few, spikes short dense or longer and laxer; *Italy*—sterile branches many, spikes more or less dense, scale often leafy; *Sardinia* and *Austria-Hungary*—sterile branches many, spikes rather lax; *Turkey* and *Rumania*—sterile branches many, spikes lax, calyx-lobes more rounded; *Greece*—sterile branches many, spikes very short dense, calyx small with lobes rounded; *South Russia*—very variable, many sterile branches, lax spikes, calyx of normal size with lobes triangular-acute, or sterile branches few or none, spikes dense, calyx small with rounded lobes.

A variety, *patens*, of which I have examined a type-specimen in Herb. Boissier is mentioned by him (DC. Prodr. xii. 661) as occurring in the Altai region near Loktiew, Siberia; I have not seen examples from other countries.

The synonymy, description, and distribution in Europe of the plants under discussion may stand as follows :—

LIMONIUM BELLIDIFOLIUM Dum. Fl. Belg. 27 (1827).

Statice Limonium L. γ *bellidifolia* Gouan, Fl. Monsp. 231 (1765).

S. reticulata Sm. Eng. Bot. No. 328 (1796) ; Sm. Fl. Brit. 342 (1800) ; Bieb. Fl. Taur.-Cauc. i. 250 (1808) ; Sm. Eng. Fl. ii. 116 (1824) ; Hook. Brit. Fl. 146 (1830) (non L., nec al.).

S. oleæfolia, Host, Synop. Pl. Aust. 177 (1797) (non al.).

S. cordata Suffr. Princip. Bot. 132 (1802) (non al.).

S. bellidifolia DC. Fl. Fr. iii. 421 (1805) ! Poir. Dict. vii. 402 (1806) ; Willd. Herb. !

S. caspia Willd. Enum. Hort. Bot. Berol. 336 (1809), and Herb. !

S. airoides Tausch in Flora Supp. Syll. Ratisb. ii. 255 (1828).

Icones.—Reichb. Ic. Fl. Germ. et Helvet. xvii. T. MCXLII. f. 3 ! Reich. Ic. Crit. 2, f. 335 ! Gmel. Sib. 2, t. 89, f. 2 (mala !) ! Eng. Bot. v. t. 328 ! Coste, Fl. Fr. 3036 !

Exsicc.—Reichb. Fl. Germ. Exsicc. 1908 ! Porta et Rigo, It. ii. 376 ! Billot, Fl. Gall. et Germ. 446 ! 446*bis* ! Orphanides, Fl. Græc. Exsicc. 695 ! Dörfler, Herb. Norm. 4175 ! Becker, Pl. Wolg. Infer. 40 ! Sieber, Dalmat. 387 ! Lang et Szovitz, Pl. Ruthen. Cent. i. 87 ! Magnier, Fl. Select. Exsicc. 1526*bis* ! Callier et Dörfler, It. Taur. 711 ! Schultz, Herb. Norm. Nov. Ser. 4, 327 ! Reliq. Mailleanæ, 660 ! De Heldreich, Pl. Græc. 1806 ! (the small-flowered plant mentioned on p. 430). Rehmann, It. Taur. 754 !

Planta *tota granulato-scabra*, glabra ; squamæ rarissime foliaceæ ; scapus fere ab imo ramosissimus ; *rami plurimi inferiores steriles*, *multifidi*, raro pauci aut rarissime nulli ; folia *mox evanescentia*, fere modica, obovata vel lanceolato-obovata ; spicæ breves et densifloræ vel longiores et laxifloræ ; bractea exterior $\frac{1}{2}$–$1\frac{1}{4}$ l. longa *a basi hyalina* ; bractea interior $1\frac{1}{2}$–$1\frac{3}{4}$ l. longa, *dimidio et amplius longior quam bractea exterior*, *marginibus et superiore tertia parte* (*rarissime dimidio*) *hyalinis ;* calyx $1\frac{1}{2}$–2 l. longus (rarissime minor), lobis albis nunquam coloratis *triangularo-acutis* vel rarius abbreviatim rotundatis, sæpe subtiliter denticulatis *dentibus intermediis nullis*.

Plant $1\frac{1}{2}$–16 in. high or long, not hairy but scabrid-granular, particularly in upper parts. *Scape* stout or slender, very much branched from near its base ; erect or decumbent, and when the latter often forming a circle. *Leaves* soon disappearing, 1-3-veined, usually 1, $\frac{1}{2}$–2 in. long, usually small, obovate or lanceolate-obovate obtuse or more acute and mucronate ; petiole commonly about as long as blade. *Branches* erect, spreading, or (occasionally) arcuate-recurved ; many lower usually wholly sterile and much divided, occasionally almost simple or wanting and all branches floriferous. *Branchlets* often much subdivided. *Scales* triangular-acute, the larger ones with acuminate points, about 3 lines long at base of scape to $\frac{1}{2}$ line at summit ; very rarely the lower scales are foliaceous (chiefly in Italy). *Spikes* often scorpioid, either

short and dense-flowered (usually accompanied by few sterile branches), or longer and lax-flowered (with more copious sterile branches), but all variations occur. *Spikelets* 2–3-flowered, distichously and densely imbricate or contiguous or even distant (rare). *Outer bract* ½–1¼ lines long, and about as broad, ovate obtuse, mucronate or not, wholly hyaline with faint veins at base. *Middle bract* ¾–1¼ lines long, irregularly oblong-obovate, bifid or truncate or rounded, hyaline with veins. *Inner bract* 1½–1¾ lines long, ovate or obovate, broadly hyaline at sides and upper third (in Russia very rarely on upper half), more than half as long again as outer bract. *Bracteoles* 1 line long, oblong-obovate, hyaline, rounded or blunt. *Calyx* 1½–2 lines long, irregularly hairy near base, particularly on veins, occasionally almost glabrous, calyx-lobes triangular-acute or (particularly in Greece and Russia) shallowly rounded; veins of calyx not running beyond base of lobes, and rarely so far; lobes white, never coloured, often finely denticulate, with no intermediate teeth. *Corolla* small, pale lilac.

Distribution.—England: 27. *Norfolk East.* Cley! *Mr. Woods* (Herb. Borrer); 1834! *C. C. Babington & J. S. Henslow* (Herb. Edinburgh). Cromer! 1838, *H. Baber* (Herb. Brit. Mus.).—28. *Norfolk West.* Holme! 1807, *Dr. Sutton* (Herb. Kew). Wells! *Herb. D. Turner* (Herb. Kew). Holkham! 1844, *Miss Carr* (Herb. Petersburg). Titchwell! 1847, *K. Trimmer* (Herb. Watson). Hunstanton! 1866, *M. A. Lawson* (Herb. Brit. Mus.). Near Heacham! 1886, *J. T. Powell* (Herb. W. R. Linton). Burnham Overy! and Brancaster Marshes! *Miss Bell* (Herb. Watson).—29. *Cambridge.* Near Wisbeach! 1796, *Jas. Sowerby* (Herb. Brit. Mus.).—54. *Lincoln North.* On the sea-beach at Freston! *Banks* (Herb. Brit. Mus.). [53. *Lincoln South.* Forssdyke Wash, *Sir J. Banks.* Record doubtful.] France—south and south-west coasts (Bouches-du-Rhone! Hérault! Aude! Pyrenées-Orientales! Basses-Pyrenées!); Spain—north-east coast (Catalonia!); Balearic Isles (Nyman); Italy—north-east and south-east coasts (Venetia! Emilia! Apulia!); Sardinia!; Corsica!; Austria-Hungary (Dalmatia!); Greece (Attica!); Rumania!; Rumelia (Nyman); Turkey—south-east coast (Macedonia!); Russia—all along the southern shores and extending inland some two hundred and fifty miles (Astrakhan! round the Black Sea! Caspian Sea! Sea of Azoff! Bessarabia!).

For the English county records I have noted the earliest occurrences for the plant from herbarium specimens examined.

LIMONIUM BELLIDIFOLIUM Dum. var. PATENS.

S. caspia Willd. var. *patens* Boiss. in DC. Prodr. xii. 661.

S. patens Fisch. herb.!

Whole plant, including bracts, calcareously-scaly; branches of scape more patent than in type; sterile branches practically absent; hairs on calyx adpressed.

Found by Fischer on the Altai Plains about Loktiew, Western Siberia!

NOTES ON THE "LIST OF BRITISH SEED-PLANTS."—II.

By A. B. Rendle, D.Sc., F.L.S., & James Britten, F.L.S.

Since the publication of our List and of the notes upon it which appeared in this Journal (pp. 99–108) considerable attention has been paid to nomenclature. Messrs. Schinz and Thellung have published in the *Bulletin de l'Herbier Boissier* a long series of carefully prepared notes, concluding with an article having especial reference to our List; and Dr. Erwin Janchen has a number of suggestions in the *Mitteilungen des Naturwiss. Verein. an der Universität Wien*, and has communicated others to us by letter. It seems therefore desirable to place on record such corrections of our List as appear to us necessary, with indications of the reasons why, after careful consideration, we do not accept some of the suggestions which have been made. The corrections are more numerous than we hoped would have been the case; some may be accounted for by the unfortunate omission from the Rules of any special reference to what Messrs. Schinz & Thellung have called "still-born" names, as to which a note follows. It was inevitable that the extended investigation by numerous botanists, which has resulted from the publication of our List, should bring to light points which had been overlooked; and we take this opportunity of thanking numerous correspondents—among them Dr. Otto Nordstedt, the Rev. E. S. Marshall, Messrs. W. A. Clarke, G. C. Druce, H. & J. Groves, W. P. Hiern, and others—for many criticisms and suggestions.

Messrs. Schinz & Thellung describe as "still-born" (totgeboren), names "deren Aufstellung von Anfang an unter Verletzung einer Regel erfolgt ist," *i. e.* which at their origin transgressed the present rules of nomenclature, especially Article 48 which insists on the adoption of the earliest specific name. It is much to be regretted that this point, which arises from the retroactive character of the Rules indicated in Article 2, was not discussed at the Congress. In cases of arbitrary change of names such as occur frequently in Lamarck's *Flore Française*—e. g. *Leontodon vulgare* Lam. vice *L. Taraxacum* L., *Linum multiflorum* Lam. vice *L. Radiola* L., &c.—and at a later date by Salisbury—*Erysimum alliaceum* Salisb. vice *E. Alliaria* L.—we accept their position. Later authors are not justified in departing from the trivial given by the founder of the species, except in cases where this would involve repetition of the genus-name; and names thus formed cannot be taken into consideration in subsequent changes of nomenclature. Thus the combination *Alliaria alliacea* published in our List cannot stand, as Salisbury had no right to change the trivial given by Linnæus. But we cannot agree with Schinz & Thellung (*l. c.* 506) in regarding as still-born such names as *Cucubalus latifolius* Miller, which were considered by the author to represent a distinct species; thus Miller has both *C. Behen* (following Linnæus) and *C. latifolius* (as a new species), and is very careful to discriminate between the two. The fact

that *C. latifolius* is now regarded as a synonym of *C. Behen* L. does not justify setting it aside as a name established in contravention of the Rules. If we extend the term still-born beyond cases of the mere substitution of names such as those quoted from Lamarck, it becomes impossible to set a limit to its use. It is then a botanical question concerned with the limitation of species.

A few alterations in the attribution of genera will be corrected in the next edition of the List. In some cases where we see no reason to depart from our original position we have made no note: *e. g.* as to *Malva rotundifolia*, about which there is admittedly a divergence of opinion.

A note may be added on Linnæus's *Flora Anglica*. A careful consideration of this list of plants has convinced us that the names contained therein must be regarded as bearing the same rank as they do in the *Species Plantarum*. Where a species in the latter contained varieties which occur in the British flora, the species-name is introduced only with the first variety, *e. g.* :—

Medicago polymorpha arab.
minima.

Primula veris officin.
elatior.
acaulis.

In the ninth edition of Babington's *Manual*, Messrs. Groves use *P. acaulis* L., and in this Journal for 1906 (p. 179) refer this name to Linnæus's *Flora Anglica*. But a comparison of this and other cases with the *Species Plantarum* shows that Linnæus always inserted varieties in the *Flora Anglica* in this way—that is, without repeating the species-name. We should read the reference in *Flora Anglica* as *P. veris* [var.] *elatior*, *P. veris* [var.] *acaulis*, &c. A further proof is found in the fact that in *Spec. Plant.* ed. 2, which was later than the *Flora Anglica* (1754), these names occupy the same rank as in ed. 1, *i. e.* appear as varieties. It is absurd to suppose that Linnæus in 1754 raised to the rank of species plants which a year before he had considered varieties, to which rank he again reduced them in 1762; yet on no other supposition can these names be regarded as of specific rank. An interesting confirmation is found in the method of citation under *Trifolium* of the species of the section *Melilotus*: thus in the *Flora Anglica* Linnæus has

Trifolium Melilotus offic.
Ornithopodioid.

Here, as in the previously cited cases, he omits the repetition of the middle word; the citation in full is *Trifolium Melilotus Ornithopodioides*. We assume that no one would quote this as *T. Ornithopodioides* L.

As in our previous notes, the number prefixed to the genus is that which it bears in the List.

4. Adonis annua L. Schinz & Thellung use *A. autumnalis* L. Sp. Pl. ed. 2, not *A. annua* L., which included two species. We consider that the name given by Linnæus should, if possible,

be kept for one, and we therefore follow Hudson in restricting it to the British plant. *A. annua* L. sensu restricto (Hudson Fl. Angl. 209, 1762), moreover antedates *A. autumnalis* L. Sp. Pl. ed. 2, 771, as is seen from the fact that Linnæus quotes Hudson's book in his list of authors, and also refers to it in the text, *e. g.* under *Cistus polifolius*, p. 745.

6. RANUNCULUS DIVARICATUS Schrank. Messrs. Groves have shown (Journ. Bot. 1907, 379) that this is a nomen confusum, and the same remark applies to *R. fœniculaceus* Gilib. adopted by Schinz & Thellung. The plant should stand as R. CIRCINATUS Sibth. Fl. Oxon. 175 (1794).

[14. "ACTÆA NIGRA Miller, Gard. Dict. ed. 8 (1768), n. 1," adopted by Schinz & Thellung, is non-existent. Miller's name is *A. spicata* (= *A. spicata* var. *nigra* L.); he distinguishes as *A. alba* Linnæus's var. *alba*.]

16. CASTALIA ALBA. The authority for this name should stand as Wood in Rees Cyclop. vi. (1806).

28. BARBAREA LYRATA Aschers. This name depends on *Erysimum lyratum* Gilib., which was a mere substitution for *E. Barbarea* L., and therefore still-born. The name should stand as B. VULGARIS [R. Br. in] Ait. Hort. Kew. ed. 2, iv. 109 (1812).

29. ARABIS STRICTA Huds. (1778) is antedated by A. SCABRA All. in Misc. Taur. v. 74 (1774).

34. ALLIARIA ALLIACEA as we have pointed out above cannot stand, being founded on *Erysimum alliaceum* Salisb., a still-born name. The name to be adopted is A. OFFICINALIS Andrzj. ex Bieb. Fl. Taur.-Cauc. iii. 445 (1819).

45. TEESDALEA Br. should be TEESDALIA.

56. HELIANTHEMUM MARIFOLIUM Miller must give place to H. CANUM Baumgarten Enum. Stirp. Transsilv. ii. 85 (1816). As Dr. Janchen points out, *Cistus marifolius* L. is a plant with somewhat pointed leaves, restricted to the south of France, while *H. marifolium* Mill. is a synonym of *Cistus canus* L., the British plant.

H. POLIFOLIUM Mill. In his monograph of *Cistaceæ* in the *Pflanzenreich*, W. Grosser regards *Cistus polifolius* L. Sp. Pl. ed. 2, 745, as a form of *C. apenninus* L. Sp. Pl. ed. 1, 529, and therefore takes the earlier name for the aggregate species. But we think this extension of the species will hardly commend itself to British botanists.

H. CHAMÆCISTUS Mill. Janchen (*in litt.*) suggests replacing this by *H. nummularium* Mill. (= *Cistus nummularius* L.). But there is no evidence either from Miller (whose plant has white flowers) or Linnæus, who cites for the sole habitat Montpellier, that this is the British plant, and the specimen in the Linnean herbarium does not appear to be *H. Chamæcistus*.

57. VIOLA SYLVESTRIS Lam. This should be cited as of Kitaibel in J. A. Schultes Oesterr. Fl. iv. pt. 1, 423 (1814). Lamarck's name is merely a substitution for *V. canina* L. in its

unrestricted sense, and is therefore still-born. Kitaibel was the first to separate from *V. canina* the plant in question; and Reichenbach, when further restricting the species by the separation of *V. Riviniana*, quotes Kitaibel for the restricted *V. sylvestris*.

60. DIANTHUS GRATIANOPOLITANUS Vill. (1789.) There is no question that D. GLAUCUS Huds. Fl. Angl. ed. 2, 185 (1778) is *D. cæsius* Smith (1792), for which *D. gratianopolitanus* was adopted as an earlier name. Hudson refers to it as the Cheddar Pink, and quotes an excellent description and figure from Dillenius (Hort. Elth. 401, t. 298, f. 385). In ed. 1 of the *Flora Anglica*, Hudson merely copied Linnæus's diagnosis and his citation from Dillenius (Hort. Elth. 400, t. 298, f. 348 [384])—the latter referring to an entirely different plant—with the addition of the Cheddar locality. *D. glaucus* of Linnæus Sp. Pl. 411 is thus very doubtful; the specimen in his herbarium is certainly not *D. cæsius*. We therefore abandon him as the authority for *D. glaucus*, and cite it as of Hudson, ed. 2; plants in Herb. Mus. Brit., "from Curtis as *glaucus* Huds." are noted by Smith, "*This glaucus* Huds. is a new species." Linnæus gives "Anglia" as the habitat, but this, as appears from his *Flora Anglica* (p. 16), was based on a reference to Ray Syn. iii. 336, n. 2, which includes more than the Cheddar plant.

62. SILENE MARITIMA With. (1796) is antedated by S. AMŒNA Huds. Fl. Angl. 164 (1762).

72. CERASTIUM VISCOSUM L. and C. VULGATUM L. Owing to the undoubted confusion which has arisen from Linnæus onwards in the use of these names, Schinz & Thellung abandon them; but after careful consideration we prefer to retain them, as we are unwilling to abandon names given by Linnæus unless it seems absolutely necessary.

75. ALSINE. We retain the generic name *Alsine*. It is true that *Spergularia* occurs in the list of names to be retained which forms an appendix to the Vienna Rules, but it is inserted in that list only with reference to the two genera of Adanson—*Buda* and *Tissa*—and not to the Linnean genus *Alsine*. We also follow Hiern (Journ. Bot. 1899, 317) in regarding the British species as congeneric with *Alsine segetalis* L.

85. HYPERICUM QUADRANGULUM L. Schinz & Thellung wish to substitute for this *H. acutum* Moench Method. 128. This, however, is a still-born name, being an absolute synonym of *H. quadrangulum* L., which Moench cites. He occasionally substituted new trivials for those previously given, *e. g.* on p. 129 three other Linnean species of *Hypericum* are renamed. *H. acutum* cannot therefore be used in the restricted sense of the later name, *H. tetrapterum* Fries. We follow Crantz (Stirp. Austr. ed. 2, 98, 1769), who retains the name *quadrangulum* for part of the original Linnean species (he cites the Linnean synonymy of Bauhin), and makes a second species, *H. maculatum*, which we also retain.

89. OXALIS STRICTA L. and O. CORNICULATA L. There is no doubt as to the identity of these plants. Linnæus copied his diagnosis of *O. stricta* from Gronovius Virg. 161, and gives the

habitat as Virginia. We cannot follow Schinz & Thellung in their statement, "*O. stricta* L. Sp. Pl. ed. 1, 435, ex minima parte quoad syn. Gron. Virg.," for how can the diagnosis be regarded as minima pars? It is impossible to dissociate the diagnosis "caule ramoso erecto" from Gronovius's plant as do Schinz & Thellung, since Linnæus took his diagnosis from Gronovius, and no doubt had Gronovius's plant before him. We agree with these authors that *O. Dillenii* is synonymous with the Gronovian plant, *i. e.* true *O. stricta*. Again we agree in regarding "*O. corniculata* L. Sp. Pl. quoad Hort. Cliff." as synonymous with *O. europæa* Jord., but we cannot follow them in regarding the Hort. Cliff. reference as "*O. corniculata* L. ex minima parte," because the diagnosis is from Hort. Cliff. p. 175, of which we have the type; this is not a matter of synonymy, but the original diagnosis. It is true that Linnæus adds the word "diffuso" in the Sp. Pl., but this is merely to distinguish the species from his additional species *O. stricta* taken from Gronovius and described as "erecto." It was as a result of the study of these original specimens in the National Herbarium that Dr. Robinson arrived at the conclusions which we follow.

101. MEDICAGO MINIMA L. must be cited as of Desrousseaux in Lam. Encycl. iii. 636 (1789) (see note on *Flora Anglica*, p. 434). We cannot follow Schinz & Thellung, who cite the name as of Bartalini Cat. piant. Siena 61 (1776). Bartalini gives in addition to the name only two references, one to the general description of *polymorpha* given by Linnæus (who made *minima* a var. of *polymorpha*), and the other "Medica echinata glabra cum maculis nigricantibus, I. B. 3 [ii.] 384," which does not refer to *minima* of Linnæus, as that plant has not black spots. Further, Bartalini does not quote the right synonym for *minima* from J. Bauhin, cited by Linnæus, viz. *Medicago echinata minima*, of which Bauhin has a good figure on p. 386.

102. MELILOTUS. We follow Schinz & Thellung in the alteration of the names of the yellow-flowered Melilots. *M. officinalis* Lam. Fl. Fr. ii. 594 (1778) includes three plants, two with yellow and one with white flowers. Desrousseaux in Lamarck's *Encyclopædia* iv. 63 restricts the name to the two yellow-flowered species, and Thuillier (Fl. Paris, ed. 2, 378 (1799)) separates *M. altissima* from *M. officinalis*, which therefore remains for the plant called in our List *M. Petitpierreana* Hayne. The names therefore stand thus:—M. ALTISSIMA Thuill. *l.c.* vice *M. officinalis* Lam.; M. OFFICINALIS Lam. *l.c.* vice *M. Petitpierreana* Hayne.

103. TRIFOLIUM MEDIUM L. and T. SQUAMOSUM L., and VICIA ANGUSTIFOLIA L. (109). These names are quoted by Schinz & Thellung in error from the first edition of Linnæus's *Flora Anglica*; they appear for the first time in the second edition published, as cited by us, in the *Amœnitates* (iv. 1759). As we have already pointed out, it is absurd to call these names *nomina nuda*. In the case of *V. angustifolia* the identification is based on somewhat slender evidence, but has always been accepted by British botanists.

123. Potentilla sylvestris Neck., as Schinz & Thellung point out, must be replaced by P. erecta Hampe in *Linnæa*, xi. 50 (1837); it was the *Tormentilla erecta* L. Sp. Pl. 500.

P. verna L. Schinz & Thellung, following Ascherson & Graebner (Syn. Fl. Mittel-Europ. vi. pt. 1, 792), abandon this as a "nomen omnino confusum." But in view of the facts that the Linnean species is generally admitted to include the plant known to British botanists as *P. verna*, and that the specimen in the Linnean herbarium is that species, we have retained the name in preference to *P. Tabernæmontani* Aschers., which is adopted by Schinz & Thellung.

129. Rosa villosa L. We do not follow Schinz & Thellung in abandoning this name on the ground of confusion. There is no confusion as regards British botany, though the name is admittedly a group name.

136. Epilobium parviflorum, roseum and obscurum Schreber Spicil. Fl. Lips. 1771. It is necessary to quote these names from the Conspectus at the end of the volume which serves as an index; in the body of the work the species stand under *Chamænerion*.

E. alpinum L. We agree with Mr. E. S. Marshall in following Haussknecht's monograph of the genus (p. 159), where it is shown that the plant in the Linnean herbarium is *E. lactiflorum*, and that the Linnean description includes both *anagallidifolium* and *lactiflorum*; therefore the name *alpinum* should be retained for *lactiflorum*, and the British plant stands as E. anagallidifolium Lam. Encycl. ii. 376 (1788).

143. Cotyledon Umbilicus should stand as C. Umbilicus-Veneris L.

148. Drosera. Schinz & Thellung have called in question our use of Hudson's names. There is no doubt, from the citation of Ray and the English name—Great Sundew—that Hudson's *D. anglica* (ed. 2) is our largest sundew, and that his *longifolia* represents *intermedia*, in spite of his citation of Parkinson's figure of the Great English Sundew. In his first edition Hudson followed Linnæus in applying the name *longifolia* to the aggregate species, and in his second edition separated *D. anglica*.

177. Daucus gummifer. The reference should be to Allioni in Misc. Taur. v. 182 (1774).

179. Torilis Anthriscus. The reference should be to Gmelin Fl. Bad. i. 615 (1805).

184. Physospermum Cusson (1787). An earlier name for this genus is Danaa All. Fl. Pedem. ii. 34, t. 63 (1785). The species therefore stands as D. cornubiensis Burnat Fl. Alp. Marit. iv. 99 (1906), where an exhaustive account of the synonymy is given.

196. Galium saxatile L. Schinz & Thellung abandon this name in favour of *G. hercynicum* Weigel Obs. 25 (1772), on the ground that *saxatile* is localized by Linnæus as a Spanish coast plant. However, botanists generally consider the two synonymous,

including Willkomm and Lange (Prodr. Fl. Hisp. ii. 316), and the plant in the Linnean herbarium is our British species.

G. ASPERUM Schreber Spicil. Fl. Lips. iii. (1771) is an earlier name for G. UMBELLATUM Lam. (1788) and *G. sylvestre* Poll. (1776).

205. PETASITES OVATUS Hill. For this must be substituted P. HYBRIDUS Gaertn. Mey. & Schreb. Fl. Wett. iii. 184 (1801). Linnæus distinguished the female plant as *Tussilago hybrida* (Sp. Pl. 866); the male plant he called *T. Petasites*.

211. LINOSYRIS VULGARIS DC. The synonym *Aster vulgaris* Bernh. should read *A. Linosyris* Bernh.

212. INULA VULGARIS Trev. For this name must be substituted I. SQUARROSA Bernh. ex Schinz & Thellung in Vierteljahrs. Naturf. Ges. Zurich, li. 498 (1906). *I. squarrosa* L. Sp. Pl. ed. 2, 1240 (1763) is universally recognized as a synonym of *I. spiræifolia* L. Syst. (1759), hence the original trivial *squarrosa* (*Conyza squarrosa* L.) must be adopted. It cannot, however, be cited, as is usual, as *I. squarrosa* Bernh., as that name occurs only in synonymy under *I. Conyza* DC. (Prodr. v. 464).

213. PULICARIA PROSTRATA Aschers. is based on *Inula prostrata* Gilib., a still-born name for *I. Pulicaria* L. The name must stand as P. VULGARIS Gaertn. Fruct. ii. 461 (1791).

214. FILAGO GERMANICA. The reference should be to L. Syst. Nat. ed. 10, 1235 (1759).

219. MATRICARIA DISCOIDEA DC. For this must be substituted M. SUAVEOLENS Buchenau Fl. Nordwest-deutschl. 496 (1894) (= *Santolina suaveolens* Pursh Fl. Am. Sept. ii. 520 (1814)).

230. ARCTIUM PUBENS Bab. (1856). A. INTERMEDIUM Lange Danske Fl. 463 (1851) is an earlier name for this species if the plants are identical.

237. ARNOSERIS MINIMA. The reference should be to Schweigg. & Koerte Fl. Erlang. ii. 73 (1811).

240. THRINCIA NUDICAULIS Britten. The authority for this combination depends upon whether *T. hirta* Roth and *T. hispida* Roth are regarded as distinct species, as is the custom with British and most continental botanists. If combined, as suggested by Schinz & Thellung, the authority will be Lowe in Trans. Camb. Phil. Soc. iv. 28 (1831).

237*. LACTUCA MURALIS Gaertn. Fruct. ii. t. 158. Schinz & Thellung say this reference cannot be regarded as publication, but, apart from the fact that the figure gives details of the diagnostic characters, there is on p. 363 a description with reference to Linnæus's *Systema* under the name "*Chondrilla* (*Lactuca* in Icon.) *turalis*." *Turalis*, as shown by the plate, is a misprint for *muralis*, but by a further error is corrected in the errata to *ruralis*.

241*. CREPIS SUCCISIFOLIA Tausch. This must be replaced by C. MOLLIS Aschers. Fl. Brandenb. 385 (1864) (= *Hieracium molle* Jacq. Fl. Austr. ii. 12 (1774)).

242*. Hieracium sabaudum L. This should be replaced by H. boreale Fries Novit. Flor. Suec. 77 (1819).

256. Azalea L. Sp. Pl. 150. Linnæus has six species, the first five of which are now referred to his genus *Rhododendron* (*l. c.* 392); the last is *A. procumbens*. In the list of "nomina conservanda" (Vienna Rules) *Loiseleuria* Desv. (1813 not "1840") appears as superseding "*Chamæcistus* Oeder. Fl. Dan. t. 9 (1761)," which however has no existence as a genus in the work cited. We do not understand the Rules to say that Linnæus's genus *Azalea* must disappear, which it would do if *A. procumbens* were not retained.

267. Anagallis tenella. The authority should stand as Murray Syst. Veg. 165 (1774).

276. For Centaurion Gilib. read Centaurium Hill.

278. Gentiana Amarella L. There is no doubt that the Linnean species includes the British plant which some continental botanists prefer to distinguish as *G. axillaris* F. W. Schmidt, abandoning the Linnean name as an aggregate species.

283. Cuscuta Epithymum should be cited from Murray Syst. ed. 13, 140 (1774).

294. Myosotis. Schinz & Thellung regard *M. lutea* Pers. Enchir. i. 156 (1806) as synonymous with *M. versicolor* Sm., but Persoon regarded it as distinct, as also do Willkomm & Lange, ii. 504, who may be assumed to know what is an exclusively Spanish plant. The reference to *M. versicolor* should be to Engl. Bot. t. 2558 text.

Mr. Druce (in Ann. Scott. Nat. Hist. 1907, 243) takes exception to our use of *M. scorpioides* L. for the Water Forget-me-not. Linnæus (Sp. Pl. 131) included under *M. scorpioides* the British species of *Myosotis*, recognizing two varieties, *arvensis* and *palustris*, the latter being the water form. Hill (Veget. Syst. vii. 55, 1764) separates the land and water species, using Linnæus's species-name *scorpioides* for the latter. Later, in his Herb. Brit. 170 (1769), he substitutes Linnæus's varietal name *palustris* for *scorpioides*, which he cites as a synonym.

306. Scrophularia umbrosa Dum. (1827). We follow continental botanists in assuming the identity of this with the earlier *S. alata* Gilib. Fl. Lit. i. 127 (1781).

317. Veronica Buxbaumii Ten. (1811–15). We follow the general consensus of European botanists in regarding the earlier *V. Tournefortii* Gmelin Fl. Bad. Als. i. 39 (1805) as synonymous.

331. Stachys officinalis. The reference should be to Trevisan Prosp. Fl. Eugan. 26 (1842).

337. Limonium reticulatum Mill. (1768) must be replaced by L. bellidifolium Dumort. Fl. Belg. 27 (1827); see Journ. Bot. 1907, 428.

338. Statice Armeria L. must be replaced by *S. maritima* Mill. Dict. ed. 8, n. 3 (1768).

367. Ulmus glabra Huds. (1762). Schinz & Thellung wish to substitute for this *U. scabra* Mill. (1768). Hudson's plant is the Wych Elm; he has only two species, *campestris* and *glabra*.

371. Betula. B. pendula Roth Tent. Fl. Germ. i. 405 (1788) must replace B. verrucosa Ehrh. (1791). For B. alba, Schinz & Thellung prefer to use B. tomentosa Reith & Abel (1790), regarding *alba* L. as a nomen confusum.

372. Alnus glutinosa Gaertn. 1791. For this must be substituted A. rotundifolia Mill. Dict. Abridgm. ed. 6, n. 1, 1771.

386. Potamogeton Zizii Koch (1827). For this must be substituted P. angustifolius Bercht. & Presl Rostlin, 19 (1823) (see A. Bennett in Journ. Bot. 1889, 265). Schinz & Thellung quote *P. Zizii* as of Mert. & Koch in Röhlings Deutschl. Flora, 1823, 845, but the name is only mentioned there in synonymy.

P. flabellatus Bab. (1851) is antedated by P. interruptus Kitaibel ex Schult. Oesterr. Fl. ed. 2, i. 328 (1814).

393. Alisma Plantago should be A. Plantago-aquatica L.

404. Habenaria montana. As shown by Celakovsky (Lotos, 1870, 177), *Orchis montana* Schmidt is not a synonym of *H. chlorantha* Bab. but a form of *H. bifolia*; hence the name *H. montana* must be abandoned. The earliest name is *Orchis virescens* Zollikofer in Gaud. Fl. Helvet. v. 497 (1829); and the plant must stand under *Habenaria* as H. virescens Druce in Ann. Scott. Nat. Hist. 1907, 244.

[405. Ophrys fuciflora H. G. Reichenb. Schinz & Thellung abandon this name as a nomen odiosum, which they say could not be used in Swiss school-floras.]

411. Epipactis. In his *Dillenian Herbaria*, 115, Mr. Druce substitutes *Helleborine* Hill for *Epipactis*, and we agree with this substitution, the reasons for which will be pointed out in the next number of this Journal. The species will therefore stand thus:—

Helleborine Hill (Brit. Herbal, 477) 1756
1. H. latifolia Druce Dill. Herb. 115 (1907).
2. H. media Druce *l. c.*
3. H. violacea Druce *l. c.*
4. H. atrorubens Druce *l. c.*
5. H. longifolia comb. nov.

Schinz & Thellung retain the name *palustris* for the last species, as they consider that the use of *Serapias longifolia* by Linnæus in Sp. Pl. ed. 2 as an aggregate precludes its use by him in a more restricted sense in the *Systema*, ed. 12. We however adhere to the view already expressed in this Journal (p. 105).

412. Cephalanthera grandiflora S. F. Gray. Schinz & Thellung, following Janchen, employ his new combination for this species—*C. latifolia* (Miller) E. Janchen in Mitteil. Naturw. Ver. Univ. Wien, v. 111 (1907)—on the ground that *Serapias Damasonium* Miller (= *C. Damasonium* Druce) is complicated and confused, while *S. latifolium* is clear and obvious. Any confusion

that might arise attaches not to *S. Damasonium* but to *S. latifolia*, which has been referred to *C. longifolia* Fritsch and was from the first a doubtful plant (see Journ. Bot. 1907, 240). Any doubt that might remain is, however, removed by Miller's specimens of his two plants which are in the National Herbarium and both represent *C. grandiflora*.

With regard to this name, it represents as we have already pointed out (see Journ. Bot. 1907, 105) the *Serapias grandiflora* L. as further restricted by Scopoli (in full citation it would read *S. grandiflora* L. emend. Scop.). The suggestion that failing *C. latifolia* the name should stand as *C. alba* (Crantz) Simonkai is untenable, for Crantz's genus *Epipactis* has no claim to consideration, including as it does not only the *Serapias* of Linnæus, but other Linnean genera, namely *Ophrys*, *Neottia*, and *Herminium*. We note that Schinz & Thellung quote us incorrectly as citing *Cephalanthera grandiflora* as of Babington.

414. Corallorrhiza. This genus was established by J. J. Chatelain "Specimen inaugurale de Corallorhiza" 1760. He names the species C. trifida, which must stand, as the Linnean trivial *Corallorhiza* (under *Ophrys*) is inadmissible.

415. Malaxis paludosa Sw. should be cited from Vet. Akad. Handl. x. 127 (1789).

422. Crocus officinalis Hudson (1778). Schinz & Thellung substitute the name *C. albiflorus* Kitaib. (1814), but we see no reason for departing from the view we have taken, the grounds for which we have stated in this Journal (p. 106).

428. Asparagus officinalis L. For the British plant the restricted name A. maritimus Mill. Gard. Dict. ed. 8, n. 2 (1768), must be adopted.

430. Polygonatum officinale All. Mr. Druce (in Ann. Scott. Nat. Hist. 1907, 242) points out that Janchen adopts his suggestion, which we did not accept, that *P. odoratum* (Mill.) Druce should supersede *P. officinale* All. He adds that doubts have been expressed as to the identity of Miller's plant, and these doubts are confirmed by reference to Miller's specimen which is a form of *P. multiflorum*. Mr. Druce unfortunately proposes another name *P. angulosum*, "since *Convallaria angulosa* Lam. Fl. Fr. iii. 268, 1778, is earlier than *P. officinale* All. Fl. Ped. [i.] 131 (1785)," but *C. angulosa* Lam. is a still-born name, being an arbitrary change by Lamarck for *C. Polygonatum* L.

431. Maianthemum bifolium must be cited as of Schmidt Fl. Boem. iv. 54 (1794).

443. Muscari racemosum Mill. Schinz & Thellung point out that Miller's name is of doubtful application, and in view of the additional fact that Miller's specimen is an immature plant of *M. comosum*, it seems best to cite the name as of Lam. & DC. Fl. Fr. ed. 3, iii. 208 (1805).

447. Juncus obtusiflorus Ehrh. An earlier name for this is J. subnodulosus Schrank Baiersch. Fl. i. 616 (1789).

457. ERIOPHORUM POLYSTACHION L. Sp. Pl. 52 (1753). Linnæus cites Fl. Suec. 1755, which includes the following:—

"*Linagrostis panicula ampliore* Tournef.

β. *L. panicula minore* Tournef.

γ. *L. palustris angustifolia*, &c., Scheuch."

Lamarck (Fl. Franç. iii. 555 (1778)) alters Linnæus's name to *Linagrostis paniculata*; this is a still-born name. Roth (Fl. Germ. ii. 63 (1789)) separated the plant with narrow channelled leaves—*E. polystachion* γ of Linnæus—as *E. angustifolium*, retaining the original name *E. polystachion* for the plant *foliis planis* of Linnæus's diagnosis (*Linagrostis panicula ampliore* Tournef.). But later authors have apparently neglected Roth and taken *E. latifolium* Hoppe (Taschenb. 1800, 108) for the flat-leaved part of *E. polystachion* L., and have used *E. polystachion* for the plant distinguished as *E. angustifolium* Roth.

Linnæus's *E. polystachion* therefore represents the following:—

E. polystachion L. (restrict. Roth (1789)) [= *E. latifolium* Hoppe].

E. gracile Roth Catal. ii. [259] addend. (1800) = *E. polystachion* L. var. β.

E. angustifolium Roth (1789) = *E. polystachion* L. var. γ [*E. polystachion* Auctt.]. In our List, therefore, *E. polystachion* L. should stand as E. ANGUSTIFOLIUM Roth Fl. Germ. ii. 63 (1789), and *E. paniculatum* Druce as E. POLYSTACHION L. Sp. Pl. 52 (restrict. Roth).

459. CAREX.

11. C. MURICATA L. We retain this name notwithstanding Mr. E. S. Marshall's note in this Journal (p. 364). We consider that he lays too much stress on the specimens in the Linnean herbarium, neither of which, as he points out, is the plant which we understand by the name.

22. C. VITILIS Fr. is not a British plant.

26. C. ACUTA L. In view of the generally expressed doubt as to the Linnean species, we follow Ascherson & Graebner (Syn. Mittel-Eur. Fl. ii. pt. 2, 90) and other continental botanists in abandoning this name in favour of *C. gracilis* Curt. Fl. Lond. fasc. 4, t. 282 (1783).

33. C. FUSCA Allioni. Allioni gives no description of this, but puts it in a section with *spicis sexu distinctis*, whereas the plant of his herbarium, which is the plant known as *fusca* in Britain, has the top spike androgynous (see L. H. Bailey in Mem. Torr. Bot. Cl. i. 63). Allioni cites Haller & Scheuchzer, but these references do not represent the plant of Allioni's herbarium (see Bull. Herb. Boiss. 1907, 399). The earliest available name is *C. polygama* Schkuhr Riedgr. 84 (1801).

61. C. HORNSCHUCHIANA Hoppe. An earlier name is *C. Hostiana* DC. Hort. Bot. Monsp. 88 (1813), but De Candolle cites *C. fulva* Host Gram. iv. t. 95, p. 53 (1809). As *C. fulva* Goodenough in Trans. Linn. Soc. ii. 177 (1794) is, as he himself states

(*op. cit.* iii. 77 (1797), founded on error, the name must be cited as C. FULVA Host, who accurately defines the plant.

66. C. FILIFORMIS L. Ascherson & Graebner (Syn. Mittel-Eur. Fl. ii. 2, 221) point out that this is a very doubtful plant and adopt the name C. LASIOCARPA Ehrh. in Hannöv. Mag. ix. 132 (1784).

69. C. PULLA Good. Mr. E. S. Marshall points out (Journ. Bot. 1907, 366) that this is identical with C. SAXATILIS L. Sp. Pl. 976 (1753).

71. C. ROSTRATA Stokes (1787). An earlier name for this plant is C. INFLATA Huds. Fl. Angl. ed. 2, 412 (1778). In his first edition Hudson included references to Morison Hist. Oxon. and Ray's *Synopsis*, which do not represent this plant; in ed. 2 he omits these references, and alters the English name to Bottle-carex. He also adds the locality of Wales on the authority of Davies, whose specimen is in the National Herbarium.

466. ANTHOXANTHUM PUELII Lecoq. & Lam. 1847. An earlier name for this is A. ARISTATUM Boiss. Voy. Esp. ii. 638 (1845).

474. PHRAGMITES COMMUNIS Trin. Mr. Druce (Ann. Scott. Nat. Hist. 1906, 228) proposes a new combination, *P. vulgaris*, which is accepted by Janchen. This is based on *Arundo vulgaris* Lam. Fl. Fr. iii. 615, a still-born name (= *A. Phragmites* L.).

476. CALAMAGROSTIS LANCEOLATA Roth. *Arundo canescens* Weber in Wigg. Prim. Fl. Hols. 10 (1780), originally described as distinct from *A. Calamagrostis* L. is now referred to that species. Hence *canescens* is the earliest available trivial under *Calamagrostis*, and the plant stands as C. CANESCENS Druce in Ann. Scott. Nat. Hist. 1906, 228.

479. POLYPOGON LITTORALIS Smith. The reference should be to Compend. Fl. Brit. ed. 2, 13 (1816).

482. WEINGAERTNERA. This name being excluded by the Rules, the species stands as CORYNEPHORUS CANESCENS Beauv. Agrost. 159 (1812).

489. MELICA. We follow Hudson (Fl. Angl. ed. 2, 37, 1778) in our use of the names for the two species, which he was the first to distinguish.

498. FESTUCA.

1. F. FASCICULATA Forsk. Mr. Druce has shown (Journ. Bot. 1907, 164) that his combination—F. MEMBRANACEA Druce in Ann. Scott. Nat. Hist. 1906, 229—must stand for this species.

10. F. ELATIOR L. Schinz & Thellung abandon this name in favour of *F. arundinacea* Schreb.; but Hudson, who separated *F. pratensis* (Fl. Angl. 37, 1762), retained the name *elatior* for the plant known later as *P. arundinacea* Schreb., and there seems no reason to abandon it.

500. SERRAFALCUS MOLLIS Parl. There seems no doubt that *Bromus hordeaceus* L. Sp. Pl. 77 (1753) is synonymous with *B. mollis* L. Sp. Pl. ed. 2, 112 (1762). In Sp. Pl. ed. 2, Linnæus

reduces *B. hordeaceus* to a variety β of *B. secalinus*, which (see Hackel in Kerner *Schedæ* iii. 142) is regarded as a synonym of *B. mollis*. Therefore *hordeaceus* is the earliest trivial for the species, and the name stands S. HORDEACEUS Gren. & Godr. Fl. Fr. iii. 590 (1856).

516. POLYPODIUM MOLLE All. (1785). In restoring this name we followed Luerrsen & Christ. Schinz & Thellung do not regard Allioni's plant as sufficiently defined, and prefer to adopt the name *Athyrium alpestre* Rylands (in Moore Ferns Great Brit. t. vii. 1857) based on *Aspidium alpestre* Hoppe. Moore, however, merely quotes the name in synonymy.

SILENE ELONGATA BELLARDI.

BY ROBERT PAULSON, F.R.M.S.

THIS plant, which occurs on rocks in shady places in the Tarentaise, Savoie, was flowering during last August in the higher parts of the Vallée de Chavière and on the upper part of the route from Pralognan to the Col de la Vanoise. In habit it is quite distinct from typical *Silene acaulis* L. in not forming moss-like cushions, in spreading as a loose mat over the surface, and in hanging from the crevices of rocks. The flowers are on long peduncles, which carry them far above the general level of the procumbent stems; the petals are deeply notched, and of a light reddish-purple colour. The capsules were not fully formed so late as the third week in August, so that no comparisons of these could be made. In the valley stretching from Pralognan to the Col de Chavière (fifteen kilometres) three closely associated forms of *Silene*—*S. elongata*, *S. exscapa* All., and *S. bryoides* Jord.—may be seen growing at about the same altitude.

The specimens which were collected in August last correspond exactly with Bellardi's type, dated 1788, in the Herbarium of the Natural History Museum, South Kensington. The plant seems to have been generally overlooked, but it differs so much from *S. acaulis* that authors, even if they regard it as an extreme form of that plant, should not omit to mention such a distinct form when dealing with the flora of the district in which it occurs. Apart from the question as to what constitutes a species, it seems well that attention should be called to a plant that must frequently puzzle the botanist in the Alps of Savoie and Dauphiné.

Occasionally intermediate forms may be found, but they were not very evident in the valleys mentioned. In a letter from the Baron Perrier de la Bâthie, Professor of Agriculture at Albertville, he says: "Je reconnais qu'on trouve quelques specimens embarrassants entre ces formes, surtout entre les *S. bryoides* Jord. et *S. exscapa* All." May it not be that such closely allied forms hybridize?

S. elongata is omitted from De Candolle's *Prodromus*, and from

Mr. Williams's monograph of *Silene* (Journ. Linn. Soc. xxxii.), but it finds a place under *S. acaulis* in Grenier et Godron's *Flore de France* (ii. 215), to which it is also referred in the *Index Kewensis*. It may be worth while to reprint Bellardi's description, as his *Osservazioni Botaniche* (1788), in which it appears (p. 60), is not commonly accessible :—

"SILENE ELONGATA, caulescens, foliis linearibus, petalis emarginatis, calycibus subpelviformibus. Nob.

"*Luogo.* Ho trovato questa pianta sopra le più elevate montagne di Usseglio, vicino a Lautaret, e nell' anno scorso ne' monti subalpini di Montpanté.

"*Osserv.* Questa Silene ha molta affinità colla spezie chiamata dal Linneo *Silene acaulis*, e colla *Silene exscapa* della *Flora Pedemontana*. Si diversifica però da tutte due par essere fornita di un fusto, che si eleva all' altezza di tre o quattro dita, e sostiene due o tre conjugazioni di foglie lineari. Non forma un cespuglio denso come le due precedenti, ed ha i rami distanti alquanto gli uni dagli altri. Il suo fiore è un po' più grande, ed il calice è più turgido; del resto è affatto simile a quello della *Silene acaulis*. Con tutto ciò subbene alla stessa elevazione abbia osservato cespugli della *S. acaulis* e della elongata in siti poco distanti, non vorrei sostenere che non possa essere un' insigne varietà di quella, e della *exscapa* del Signor Allioni, dopo le replicate osservazioni fatte intorno alle varietà, a cui va soggetta la *S. acaulis*, la quale nello stesso cespuglio proveniente da una sola radice mi presento esemplari simili alla *Silene exscapa*, altri con il fusto alto un' oncia e più, altri con fiori rossi, altri di un rosso più dilavato, ed altri perfettamente bianchi. Ho creduto intanto conveniente distinguerla, affinchè consti appresso i Botanici la memoria di tal pianta e possano meglio sopra di essa determinare il loro giudizio colla scorta di ulteriori osservazioni."

RUBUS MUCRONATOIDES.

BY THE REV. AUGUSTIN LEY, M.A.

THE plant noticed under this name by Rev. W. M. Rogers (*Handbook of British Rubi*, p. 55) as a form of *R. mucronatus* having recently proved to possess a wide range in the British Isles, it becomes desirable to direct further attention to it. I have the concurrence of Mr. Rogers in publishing it as a separate species, and append a full description :—

RUBUS MUCRONATOIDES Ley in Rogers Handb. Brit. Rubi, 55 (1900). *Stem* low, arched, angular, with few scattered hairs and acicles; prickles unequal, not confined to the angles, the larger rather stout, long, declining. *Leaves* ternate or quinate, petioles prickly, leaflets large; terminal leaflet 2½–3 times as long as its petiolule, broadly oval, gradually acuminate, margin often sublobate in the upper half, base cordate; serration rather coarse

with mucronate crenate teeth. *Panicle* pyramidal, or straggling with the side branches, much lengthened, and their flowers very long peduncled; primordial flower always very short stalked. *Rachis* wavy, its prickles many, unequal, the larger rather strong, long, declining, passing into gland-tipped acicles and stalked glands. *Flowers* large, cup-shaped, petals usually rose, narrow, distant long, externally hairy, margin ciliate. Stamens white, soon rose-coloured at base, longer than the green styles. Sepals reflexed in flower and fruit.

From its nearest ally, *R. mucronatus* Blox., this plant is distinguished by the angled stem, stronger and more unequal armature of stem and rachis, gradually acuminate and partly lobate terminal leaflet with coarser serration, broader straggling panicle, and reflexed sepals.

Localities:—*Hereford*: Kington, Kinnersley, Brilley, and other stations in the north-west; first in 1884. Black Mountain district. *Radnor*: Corton and Presteign. *East Inverness*: Nairn! and *East Ross*: Rosemarkie! 1898, *Marshall*. *Ireland*: Malleranny, Co. Mayo! 1899, *Marshall*.

The Scottish plant is a rather stouter form; the Irish agrees in all points with the plant of Hereford and Radnor.

BOTANICAL EXCHANGE CLUB REPORT, 1906.

[The Report of the Botanical Exchange Club for 1906, "by the Editor and Distributor, the Rev. W. R. Linton," issued in April, is prefaced by the "Secretary's Report," containing a summary of "the chief items of botanical interest of the year." This is signed by Mr. Druce, who, although only announced as Treasurer of the Club, apparently combines with this the secretarial office. Here, in at least one instance, and more frequently in the list of desiderata, Mr. Druce finds an opportunity for indulging his passion for new combinations—with, it is to be feared, the too frequent result of encumbering nomenclature with useless synonyms; an example of this has already been given in this Journal (p. 240). But even should the names stand, we cannot think it right to publish them in such a list; and nothing can justify the erection of the slip by which Messrs. Colgan & Scully wrote *Polygonum sagittifolium* instead of *P. sagittatum* into a synonym as "*Polygonum sagittifolium* Colgan & Scully"! This, by the way, appears in a note of Mr. Druce's in the Report proper, and we are surprised the editor allowed it to pass. If such synonymy is to be recognized, Mr. Druce may add yet further to the names for which he stands *in loco parentis*: we find in the desiderata list "Agropyron lepens," which by analogy must be quoted in future as "*Agropyron lepens* Druce." We note that Mr. Druce has anticipated criticism and secured another name by giving as a synonym of his *Salvia Marquandii*, published in this Journal as recently as December last, "*Salvia Verbenaca* var. *Marquandii*."

The Report as usual contains a variety of interesting notes on the specimens received and distributed, from which we extract a few of those of more general interest. As usual, there are a number of opinions about critical forms of *Rubus* (4 pages), *Rosa* (4 pages), *Hieracium* (5 pages) and other genera, but for these reference must be made to the Report itself.

The Editor and Distributor for 1907 is the Rev. H. J. Riddelsdell, St. Michael's College, Llandaff.—Ed. Journ. Bot.]

Tilia cordata Mill. Leaves from stump-shoots; and fruit, King's Wood, near Yatton, North Somerset, Sept. 19th, 1906. When underwood is cut in the old limestone woods below Bristol the stumps quickly produce an abundance of strong succulent shoots. These, in the earlier years of their growth, whether they be oak, hazel, aspen or lime, bear leaves of unusual size and shape. In the case of the two last-mentioned trees the difference in area, outline, and texture between these stump-shoot leaves and ordinary foliage is so great that the former would hardly be recognized if the conditions that produced them were not known. I send herewith examples from *T. cordata* stumps in illustration. Most of them are 5–7 in. in length and nearly as broad. They several times exceed their petioles, in contradiction to one of the main characters that distinguish the species. There is, moreover, an exaggeration of toothing and of basal one-sidedness, besides the attenuation into an acuminate point, which makes the leaf longer than broad, whereas the length of a typical adult leaf is commonly less than the breadth. This attenuation into a long point is also well marked in the stump-shoot leaves of *Populus tremula*, which make a still greater contrast with the suborbicular normal leaves of that tree. I think one must assume that these are examples of hypertrophy due to an excessive supply of water and food-material under pressure. When a tree is coppiced the stump is so surcharged with sap that many adventitious buds form along the vitally active cambium layer, and these buds, stimulated by the concentrated nutriment available, develop into vigorous shoots bearing abnormal leaves. As the shoots lengthen year by year the hypertrophy diminishes until the bush once more attains full stature, and it then bears only typical foliage. It has been said that the small-leaved lime produces fruit but rarely, and a walk through our woods might support that idea. The fact is, however, that this tree does not flower until of good age, and that it is often coppiced before reaching that age. Older trees as well as coppice-bushes that escape the usual fate of underwood for a sufficient time flower freely and bear plenty of fruit.—James W. White.

Alchemilla vulgaris var. filicaulis (Buser). Near Ingarsby Tunnel, Leicestershire, May 12th, 1906, v.-c. 55. The specimens sent for distribution last year being of rather abnormal size, a few are contributed for this year of the usual type for comparison, though in all other respects they exhibit the characters of the variety to an equal extent. It may almost be said to be the type of the

species locally, *A. pratensis* Schmidt being of comparatively rare occurrence in Leicestershire or the Midlands generally, whilst it seems that the converse obtains in the southern and western counties, the var. *alpestris* (Schmidt) being also confined more or less to the north and west of England, and seldom or rarely in the central counties.—A. R. Horwood.

Erica Mackaii Hook. On Craigga-more, a stony moorland hill of about 250 ft. elevation, and on the adjoining heath on peat, apparently avoiding the wetter portions, and in profuse flower in the drier places. Abundant over a limited area, and keeping remarkably true in its botanical characters. Near Roundstone, Galway, September.—G. Claridge Druce.

Limosella aquatica L. Port Meadow, Oxford, August, 1906. *Limosella* was first found near Oxford by Sir Joseph Banks about 1760, but Sibthorp records it in *Fl. Oxon*, 1794, from Noke and Binsey Common, the latter doubtless the locality where Banks found it. In 1820 Baxter found it on Port Meadow, and by the towing-path near Medley Lock, which is close to the Binsey locality, and also on Cowley Marsh on Sept. 11th of that year. Since that time till 1905 we had no record of its being re-found in any of these localities. Year by year I have made search for it in vain, nor has any one of the numerous workers at our local flora been rewarded by finding it. In 1905, however, I discovered two or three plants on the south-east of Binsey Common, growing on the muddy margin of a ditch. This year Mr. A. B. Jackson found it on the muddy bed of a dried-up pond on Binsey Common in abundance, and I also found it near Upper Wolvercote on Port Meadow, and on the dried-up site of a pond at Noke. The prolonged drought appeared to be favourable to its appearance, as it prevented the plant being overshadowed by *Lemna* or *Glyceria*, &c. It is not a little singular that the plant should have for so long a period been able to exist without being noticed. I may say that, although in August the plant almost made a carpet on the mud, seeding very copiously, by the middle of September there was hardly a vestige left, the plant having been scorched by the sun. Does it exist, like *Eleocharis acicularis* is capable of doing, for many years without flowering, and then, when brought to the light and air, only produce its seeds?—G. Claridge Druce.

Liparis Loeselii Rich. var. From the Glamorgan locality, July, 1906. Less in quantity this year, and not so fine; the rabbits had bitten down a great many plants, and many others did not flower. The broader, shorter, blunter leaves and fewer flowers give the west county form of the species a distinct look. It perhaps merits a distinct name, and I would suggest var. *ovata*, if that is available.—H. J. Riddelsdell. "We approve of this plant being varietally distinguished from the type; it is well marked off from it by the features to which Mr. Riddelsdell calls attention."—A. Ley & W. R. L.

Crocus nudiflorus Sm. Trent Meadows, Nottingham, March

19th and Oct. 4th, 1906. This plant is likely soon to become extinct in this locality, as the meadows by the embankment on which it grew are rapidly being built over. It is now confined to two fields, where it grows abundantly with *Crocus vernus*.—F. L. Foord-Kelcey.

Ornithogalum pyrenaicum L. Ursleigh Hill, North Somerset, April 18th and June 14th, 1906. Complete specimens may be useful to those members who do not live within reach of the growing plant, and who may not have seen its leaves. The long flask-shaped bulb sends up in March a tuft of leaves something like those of the bluebell, but which grow to a length of about two feet. They are too weak to support themselves, and wither before the flowers appear in June. It is therefore difficult for a stranger to the locality to procure any unless he have marked down flowering plants during the previous summer.—James W. White.

Cyperus fuscus L. On the mud of a partly dried-up pond on Dorney Common, Bucks, in considerable quantity; also sparingly on the muddy margin of slow stream on the southern side of the Common, and very sparsely by a pond nearer Huntercombe, Bucks, August, 1906. A very interesting addition to the county flora, and a notable extension of its range in Britain, this being now its most easterly and most northern locality. Surely it will be found in Berks. 1906 was a specially favourable year in the Thames Valley for the observation of aquatics, owing to the prolonged drought; many places were dried which normally are under water.—G. Claridge Druce. "Little Chelsea, where it used to occur, is more easterly than Bucks."—W. R. L.

Agrostis verticillata Vill. Vale, Guernsey, July, 1906. New to the Channel Islands, and not hitherto recorded for Britain. Description: Stoloniferous, stem 6 in. to 24 in. high, geniculate-ascending, leaves flat, glaucescent, ligule short truncate, panicle compact thyrsoid-lobate, 1 to 4 in. long, whitish green or often richly purple, the branches of the panicle short and covered with spikelets to their base, glumes puberulent-scabrid over their whole surface, pales equal obtuse. Last July, when in the company of Mr. E. D. Marquand, at Vale, I saw a grass which I recognized as distinct from any known British species, growing plentifully in the excavated soil near the Vale Castle, and we afterwards found it plentifully not only in such situations but also by the sides of roads, and other dry bare places in the northern part of Guernsey, and also extending westward to Vazon and the Grande Mare. On my visit to Alderney I found it in Braye Bay, and about quarry *débris* farther east. I have also detected a piece among some plants I gathered at St. Luke's, Jersey, in the previous June, but this was on some recently disturbed waste ground. In Corbière's *Nouvelle Flore de Normandie* it is reported as a southern species naturalized for upwards of forty years at Cherbourg. From the fact of it not being a native of Western France it may be held to be also adventitious in the Channel Islands, and in an area so disturbed by the operations of man as these small islands it must be difficult to decide upon the indigenity of the species. On the

one hand there are the facts of its absence from the opposite coast of France as a native species, and that it has hitherto escaped observation in these islands, while the geographical range is not strongly in favour of it being native here; yet, on the other hand, it may be urged that it extends up the western coast as far as Spain and Portugal, that it is extremely like *Agrostis alba* var. *stolonifera* in appearance, and chooses similar situations, while in its undoubtedly native area it prefers ground which has been disturbed by man, and that it is now very abundant in Guernsey.—G. Claridge Druce.

SHORT NOTES.

Linaria arenaria DC. not a native (p. 411).—About fourteen years ago a resident at Westward Ho! sowed on Northam Burrows, in the only part where I have found *Polygonum maritimum*, some seeds of *Linaria arenaria*, which he had brought from Brittany. When he was leaving the neighbourhood soon after, the sower told me what he had done and took me to the spot, and expressed a wish that I would visit the place occasionally and note how the plants were getting on. This I have done, and have had the satisfaction of seeing that they have spread over a larger area than they at first occupied.—Thos. Wainwright.

[We fail to share our correspondent's "satisfaction" at the success of his unnamed friend's mischievous and misleading attempt, which merits and will doubtless receive the hearty condemnation of every British botanist.—Ed. Journ. Bot.]

Polystichum Braunii in England.—During his visit to England last year Dr. Kümmerle of the Botanischen Institut, Budapest, determined as a small form of this species a specimen collected by the Rev. W. H. Painter in Leigh Woods, Somerset, in June 1881, distributed as *Aspidium angulare* and now in the National Herbarium. The plant is mentioned by Dr. Kümmerle in the account of his travels in Europe published in *Jelentés, a Magyar Nemzeti Múseum*, 1906, p. 210. The following description of the plant, translated from Garcke's *Flora von Deutschland* (ed. 17, 719, 1895), may be of interest:—"*Frond* lanceolate, shortly acuminate, at base gradually attenuate, membranaceous, somewhat flaccid, bipinnate; *pinnæ* at base somewhat unequal and dilated on the upper or on both sides, above longly or shortly pointed or often obtuse, the lowest pinnæ far shorter than the rest; *pinnules* tolerably large, almost sessile, decurrent, at base entire and truncate on the upper side, above obtuse, the lowest upper pinnule a little larger than the rest; *sorus* moderately large, very convex, indusium very small, almost membranaceous."

Lycopodium clavatum L. in Bedfordshire.—The only published record for this species in Bedfordshire is that given in Abbot's *Flora Bedfordiensis*, 1798, since which there is no evidence of the existence of this plant within the county. The station given by Abbot is Potton Heath, which is situated in the north-

east of Beds. On Oct. 6th I found it in fine fruit in Birchin Grove Wood, on the south-west border of the county, about twenty miles distant from Abbot's station. Here it is distributed over several square poles, on sandy soil, associated with brambles, young birches, and *Polytrichum formosum*. This record removes the query associated with this species in the lists of the flora of the various river systems published in the Victoria County History, Beds, vol. i. p. 50, compiled by Messrs. G. C. Druce & J. Hamson. The distribution of *Lycopodium clavatum* in Beds and Herts suggests that probably it grows in Bucks, possibly in the Lower Greensand area of Bow Brickhill and Little Brickhill.—JAMES SAUNDERS.

RANUNCULUS TRIPARTITUS DC.—Mr. C. E. Salmon has kindly lent us a series of excellent specimens of the Ranunculus collected by Mr. E. S. Salmon at Catspred, East Sussex, in 1894, and referred by Mr. C. E. Salmon to *R. tripartitus* in a note in the Report of the Watson Exchange Club for 1905–6, reprinted on page 161 of this Journal for the present year. An examination of these specimens confirms the opinion we had already formed that the plant is *R. lutarius* Bouvet = *R. intermedius* "Knaf" Hiern. Mr. Salmon's plant has more completely multifid lower leaves than we had previously seen in *R. lutarius*, but they are few in number and the segments are distinctly flattened and of an appreciable width, besides apparently diverging more or less in the same plane, whereas in *R. tripartitus* the segments are truly capillary, extremely fine, and more or less tassel-like, and under normal conditions of growth the multifid leaves are fairly numerous. There are a number of other less defined characters in which Mr. Salmon's plant agrees with *R. lutarius* rather than *R. tripartitus*; the upper leaves are more nearly peltate, being less deeply divided and the lobes being broader and more rounded, corresponding with those of large robust forms of *R. lutarius*; in several specimens there are well-marked transitional leaves such as occur in the New Forest *lutarius* when it produces multifid leaves, and which are absent in *R. tripartitus*; the stems, petioles and peduncles are stouter, the stipules larger, and the carpels are larger and broader. We do not see any near affinity between Mr. Salmon's plant and *R. ololeucos* Lloyd. Up to the present we have only seen true *R. tripartitus* from four localities in the British Isles, *viz.*, Mullion, Cornwall W., J. Cunnack (1879); Innes Moor, near Roche, Cornwall E., R. V. Tellam (1876); near Wadebridge, Cornwall E., where it was discovered last year by Mr. Clement Reid, from whom and from Dr. Vigurs we have received a good series of specimens; and near Baltimore, Co. Cork, R. A. Phillips (1896).—H. & J. GROVES.

ECOLOGY OF MONTIA FONTANA (pp. 211, 282, and 306).—I agree that Mr. Riley's kind of habitat is excellently described, except that, as Mr. West points out, *Montia* does not grow in spongy bogs, even "with a very slight trickle of water." Neither in the streams on the Quantock Hills in Somerset, quoted by Mr.

Riley, nor in similar places in North Devon and Cornwall have I seen *Montia* growing in bogs properly so called, and certainly never on *Sphagnum*, as Miss Armitage points out. But in the West of England it flourishes well in the damp borders of rivulets by roads and lanes, and especially in gravelly or sandy soil. Nor have I ever seen *Montia* growing in bogs on the Continent. In France and Switzerland it grows in similar places on siliceous ground and occasionally in damp fields, and in Norway it is often seen in damp farmyards among the mountains. *Montia* grew in a typical habitat as high as 6000 ft. on the French side of the Mont Cenis Pass, *viz.* on a wet slope between a stony path and stream into which water was constantly trickling from the mountain path. Here it was associated with *Juncus triglumis* (eight inches high) and a dozen good Carices, including such rarities as *Carex incurva* Lightfoot, *C. bicolor* All., *C. fætida* All., *C. capillaris*, *C. vaginata*, *C. clavæformis*, and *C. ustulata* Wahlenb., a new station for this extremely rare *Carex* in France.—H. S. Thompson.

Potamogeton spathulæformis Morong.—In his *North American Naiadaceæ* (1893), p. 27, Dr. Morong says that "neither of its supposed parents occurs in Mystic Pond." Mr. Fryer's determination of this as a hybrid (*P. heterophyllus* × *Zizii*) is now sustained by Mr. Fernald (*Rhodora*, viii. 224 (1906)), who finds "very characteristic *P. angustifolius* (*Zizii*) collected by the late Wm. Boott in Mystic Pond, Aug. 26 (presumably in the 60's), and that in both the Gray Herbarium and in that of the N. England Bot. Club there are characteristic specimens of *P. heterophyllus* collected in Mystic Pond by Messrs. E. and C. E. Faxon."—Arthur Bennett.

NOTICE OF BOOK.

Die Bedentung der Reinkultur. Von Dr. Oswald Richter. Berlin: Gebrüder Borntraeger. Pp. vi. 128. Price 4 marks 40.

Dr. Oswald Richter's paper reminds us of the unnecessary and rather weary occupation of preaching to the already converted: we had hardly thought that any one now required to be convinced of the usefulness and desirability of pure culture experiments. When the author recapitulates as he does, however, the various occasions in which pure cultures have been successfully employed to advance exact knowledge, he attempts a much more grateful task. So viewed, his pamphlet is a compendium of information as to the cases in which such cultures have achieved the desired results. In the course of the work, instances are cited in many different branches of botanical and zoological science in which cultures have been absolutely essential for the elucidation of various biological problems: in algae, fungi, bacteria and lichens among plants, as well as in protozoa among animals. The history and results of the experiments have been gathered from literature widely dispersed in various journals, and the student is thus enabled to see at a glance what has been attempted and done in

any particular field, and to follow the lines on which these researches are carried out. Tables have been prepared presenting such work in chronological order, and full bibliographical notes refer the reader to the original sources. A copious index completes this useful compilation.

A. L. S.

BOOK-NOTES, NEWS, &c.

The number (18) of *Notes from the Royal Botanic Garden, Edinburgh*, published in August, contains an interesting list of "Eighteenth Century Records of British Plants" derived from two note-books of Dr. John Hope, who was Regius Keeper of the Garden from 1760–1786. The records, which extend over 64 pages, are preceded by an introductory note, from which we extract the following:—"One of [the note-books] contains a number of records, of date 1764 and 1765, of stations for plants about Edinburgh and in other parts of Scotland. The fly-leaf at the beginning of the book bears, in Dr. Hope's writing, 'List of plants growing in the neighbourhood of Edinburgh, collected, in flower, 1765, as a sketch of the Calendarium Floræ of Edinburgh.' The writing of the manuscript is not that of Dr. Hope, and internal evidence seems to show that he was not the compiler of the list, but it is manifest that he had looked through it, interpolated stations, and pointed out doubtful records. Upon the first page there is the heading, 'A list of plants as they were collected and prepared during the year 1764, with ye place of growth.' Dr. Hope has interpolated the words 'in flower' after 'plants' in the heading—an expression we must accept in its widest signification as used by botanists in the eighteenth century, and as referring to the sporiferous condition of Thallophytes as well as to the flowers of Spermophytes. The list continues in calendar form from March, 1764, until January, 1765, when a couple of pages are blank; and the calendar recommences with the date 14th May, and goes on until 30th October, 1765, under the new heading, 'A calendar of plants as they were found and prepared in the year 1765.' The first portion of the list is emphatically one of plants in the vicinity of Edinburgh. There are in it but a few records of stations far afield. The second portion of the list has a much larger proportion of citations of localities distant from Edinburgh. The second note-book has on the fly-leaf, in Dr. Hope's writing, 'A Catalogue of British Plants in Dr. Hope's Hortus Siceus, 1768,' and the catalogue is in the same writing, with occasional interpolations, and there are entries of date subsequent to 1768. These lists of eighteenth-century records have many features of interest, botanical and topographical, and they show us also that at the period referred to considerable attention was given to the flora of Scotland, and that field botany was a definite part of the teaching of botany by John Hope."

Miss Emily Margaret Wood, who was born in India on August 23, 1865, died at Higher Tranmere, Birkenhead, on

October 28, and was buried in Wallasey Cemetery. She was eminent as a field naturalist and science teacher, and during her twenty years' connection with the Liverpool Naturalists' Field Club she has taken a leading part in the conduct of the business of that Society. She filled the office of botanical referee since the death of the late Robert Brown, and at the time of her death had been for some years one of the Hon. Secretaries. She adapted Prof. Atkinson's *First Studies of Plant Life* for the use of English students, and drew the illustrations to Mr. C. T. Green's *Flora of the Liverpool District*, noticed in this Journal for 1902 (p. 394); her portrait appears in the group forming the frontispiece to that work. Miss Wood's pleasant *résumés* of the botanical work of each session formed an attractive feature of the annual *Proceedings* of the Field Club.

William Nation could hardly lay claim to be considered "a well-known botanist," under which heading his recent death (at Clapham, at the age of 81) is recorded in the *Gardeners' Chronicle* of Nov. 9. He was born at Staplegrove, Somerset, in 1826, and entered Kew Gardens in 1840, whence he proceeded to Peru in 1850, when he entered the service of a Spanish gentleman as head gardener. He contributed plants to the Kew Herbarium from 1862 to 1880: letters from him between 1853 and 1865 are also at Kew. Nation does not seem to have published any botanical papers, but contributed notes on Peruvian birds, &c., to the *Proceedings of the Zoological Society* from 1866 to 1874.

The valuable collection of *Diatomaceæ* formed by the late Thomas Glazebrook Rylands (b. 1818, d. 1900), of Warrington, and recently presented by his daughter, Miss Martha G. Rylands, to the British Museum Herbarium, contains some 6000 microscope-slides, a large quantity of diatomaceous material, and an extensive correspondence. In the slide-collection is included that of the late Dr. Christopher Johnson, of Lancaster, bequeathed to Rylands. Dr. Johnson was the translator of Meneghini's paper "Sulla animalità delle Diatomee" (Venice, 1845), published under the title "On the Animal Nature of Diatomeæ" by the Ray Society in a volume of *Botanical and Physiological Memoirs* (1853). Others of the slides were prepared by Walker Arnott, Greville, Gregory, G. Norman. Forty to fifty years ago there was a period of very great activity in the study of diatoms, as is well shown in the above-mentioned correspondence. This is divisible into four groups:—(1) Letters to Rylands from Walker Arnott, G. Norman, Greville, Ralfs; (2) to Christopher Johnson from Walker Arnott and Rev. William Smith; (3) to Greville from the same two writers; (4) to Walker Arnott from more than sixty of his correspondents, the chief of whom are De Brébisson (Falaise), Brightwell (Norwich), G. M. Browne (Liverpool), T. Comber (Liverpool), H. D. Crozier (Mauritius and Shorncliffe), T. Eulenstein (Canstadt), W. Gregory (Edinburgh), R. K. Greville (Edinburgh), Miss E. Hodgson (Ulverstone), F. Kitton (Norwich), G. Norman (Hull), F. Okeden (Swansea), J. Ralfs (Penzance), F. C. S. Roper (Maida Vale), T. G. Rylands (Warrington), J. Staunton (Longbridge), and G. C. Wallich (Guern-

sey). Most of these diatomists and other botanists are represented in the interesting set of photographs received with the Rylands collection. There is also a medallion of William Wilson, the bryologist, a fellow-townsman with Rylands.—A. G.

UNDER the title *Plant-Biology*, the University Tutorial Press have issued a small botanical text-book by Dr. F. Cavers, of Hartley University College, Southampton. The book is described as a text-book of elementary botany arranged for modern methods of teaching, and contains about 460 pages in small 8vo and 201 text-figures. Within this small compass Dr. Cavers has compressed a great deal of information, accompanied by suggestions and directions for a large number of illustrative experiments. The study of the plant is approached from its physiological aspect, and in this connection the author has introduced a considerable amount of purely physical and chemical subject-matter, such as the description of the thermometer and barometer, the determination of the chemical composition of water, &c. It is admittedly impossible for a student to appreciate plant-physiology without an elementary knowledge of chemistry and physics, but there are numerous elementary text-books in these sciences from which information might be gained and space saved in the botanical text-book. The two chapters dealing respectively with flowers and their work and fruits and seeds are exceptionally well illustrated, and the last three chapters—ecology of plants, biology of the soil, and principles and problems of plant-biology—form an introduction to the study of the ecological aspect of plant-life. The appendixes on the Greek and Latin roots of botanical terms and the glossary of terms will be useful; another appendix gives suggestions for practical work during the various months of the year. The index is not comprehensive. The price of the book is 3s. 6d.—A. B. R.

Our Woodlands Heaths and Hedges by W. S. Coleman was a useful book fifty years ago, when it was issued at a shilling in an attractive cover of paper boards, uniform with one of the best popular books ever written—J. G. Wood's *Common Objects of the Country*. In these days of reprints it is not surprising that Messrs. Routledge have reissued it in a neat cloth cover as a "new edition, entirely reset"; and it remains a good and useful book as far as it goes, although the field in which it was a pioneer is now abundantly occupied. The references to the insects which frequent the various trees and shrubs described will make it useful to entomologists. It is, however, unfortunate that some steps were not taken to bring the little book up to date; it saves much trouble, of course, if we can lump all our brambles under the heading *Rubus fruticosus*, but it might have been indicated that the name covers, according to modern estimate, just a hundred species, although of course it would be unreasonable to expect any attempt at their differentiation in a popular book of this kind. The plates should have been lettered, and it is difficult to explain the meanness of the publishers in printing them, in two cases, on both sides of the page. Nor do we see why it should not have been produced at its original price of a shilling—it now costs eighteenpence.

INDEX.

For Classified Articles, see—County Records; Obituary; Reviews. New genera, species, and varieties published in this volume, as well as new names, are distinguished by an asterisk.

Aceras anthropophora, 343
Achyrospermum parviflorum,* 97
Acrotheca canescens,* 169
Adams's 'Wild Flowers' (rev.), 349
Adhatoda Bagshawei,* 333
Æolanthus crenatus,* 94
African Gamopetalæ, 41, 114, 154, 197, 263, 329; lakes, botany of, 76
Agrostis canina var. lævis, 249; verticillata, 450
Alchemilla vulgaris var. filicaulis, 448
Alnus rotundifolia, 125, 163
American Nomenclature, 123
Antilles, Plants of, 118
Armitage, E., Montia fontana, 306
Arnold's 'Flora of Sussex,' ed. 2, 287
Ascocyclus affinis, 368
Ascomycetes, Interesting, 169
Aspicilia Lillei, 35
Aspilia Eylesii,* 45; polycephala,* 45
Australian Plants, 68; MSS. in Dept. of Botany, 70; Halorrhagaceæ, 135

Babiana spathacea, 76
Bagnall, J. E., 'Wild Flowers,' 349
Bailey's 'Poisonous Plants of Queensland,' 256
Baker, E. G., Revision of Bersama, 12; Limonia ugandensis,* 61
Baker, J. G., portrait, 67
Balearic Plants, 53
Banff, Proposed Flora of, 215
Barleria Eenii,* 229; jubata,* 229; lancifolia, 230; matopensis,* 91
Bartram, W., 5, 7
Batters, E. A. L.† (portrait), 385
Beilschmiedia Fordii,* 404
Bennett, A., 'Norges Flora' (rev.), 120; Potamogetons new to Britain, 172; new Potamogetons, 233; notes on Potamogeton, 371, 453
Berberis-Hybrid, 393
Berger, A., 'Sukkulente Euphorbien' (rev.), 212
Berkheya Adlami, 46
Bersama, Revision of, 12; andongensis var. ugandensis,* 21; angolensis,* 18; coriacea,* 15; Gossweileri,* 17; nyassæ,* 19; Preussii,* 16; Swynnertoni,* 14; ugandensis var. serrata,* 69
Bibliographical Notes, 68, 118, 246
Blepharis grisea,* 228
Blytt's 'Norges Flora' (rev.), 120
Botanical Exchange Club Report, 1906, 447
Boulenger, G. A., Variations of Œnothera biennis, 353
Bowles, E. A., Phyllody in Myosotis, 412
Brachystelma Bagshawei,* 330
Brachystephanus cœruleus,* 332
Brandis, Sir D.,† 288; his 'Indian Trees' (rev.), 36
Brassica, Cornish, 60, 119
Brillantaisia grandidentata,* 331
British Museum, Report of Dept. Botany, 1905, 29,—1906, 408; MSS. in Dept., 70; Notes from Herbarium, 313; Plants, List of, 126; Linnean exhibition at, 383; additions to, 455
British Seed-plants, List of, 99, 126, 433
Britten, J., Plantago lanceolata var. sphærostachya, 22; Vienna Rules for Nomenclature, 26; Thrincia nudicaulis, 31; Cystopteris fragilis, 33; 'Indian Trees' (rev.), 36; F. Justen (portr.), 62; 'Illustrations of Australian Plants,' 68; Cheeseman's 'N. Zealand Flora' (rev.), 74; 'List of Seed-plants,' 99, 126, 433; Huckleberry, 114; Plants of Antilles, 118; American Nomenclature, 123; Halorrhagaceæ, 135; Carex echinata, 163; Lyonsia, 235; Cephalanthera

longifolia, 240; Nomenclature, 244; Brown's Prodromus, 246; Some Introductions (rev.), 249; 'The Dillenian Herbaria' (rev.), 282; Rosa hibernica, 304; Notes from the National Herbarium, 313; 'Trees of Great Britain' (rev.), 382; Flora of Glamorgan (rev.), 413
Brooks, W. E., appointed to National Herbarium, 352
Brown, Robert,† 126
Brown's Prodromus, 246
Bucknall, C., Spanish and Balearic Plants, 53
Bury's Somaliland Plants, 232
Buxus in England, 346

Calamagrostis lanceolata, 380
Callymenia Larteriæ* (t. 484), 85
Camellia axillaris, 313
Canthium myrtifolium,* 266
Capraria frutescens,* 315
Carex rorulenta, 59; Pairæi, 163
Carices, Spanish and Portuguese, 211; Perth and Aberdeen, 295; hybrid, 301; in Herb. Linn., 364
Cavers's Plant Biology, 456
Census Catalogue of British Mosses, 416
Cephalanthera longifolia, 240
Cephaloziella integerrima, 66; patula, 279; piriflora, 66
Ceratites amœna, 313
Ceropegia albertina,* 57
Channel Islands Flora, 395, 419
Cheeseman's 'New Zealand Flora' (rev.), 74
Chittenden on Essex Mosses, 215
Christensen's 'Index Filicum' (rev.), 35
Churchill, G. C.,† 40, 78
Clematis Vitalba, 160
Clerodendron melanophyllum,* 93; oreadum,* 93
Climate, Effect of (rev.), 307
Coffea Engleri, 115, 197; eugenioides,* 43
Colchicum variegatum, 411
Coleman's 'Our Woodlands,' 456
Coleus matopensis,* 96; polyanthus,* 96; toroensis,* 95
Colgan, N., Senecio albescens, 306
Conopharyngia Holstii, 50
Cooke's 'Flora of Madras,' 384
Coryne urnalis (t. 485), 170
Coste's 'Flore de la France,' 80
Cotoneaster microphylla, 60, 119
Cotton, A. D., British Phæophyceæ, 368
County Records:—
Anglesea, 25
Bedford, 451
Berks, 72, 248
Bucks, 112, 120, 450
Cambridge, 432
Cardigan, 72, 159, 170
Carmarthen, 71
Carnarvon, 21, 344
Chester, 33, 163, 212
Cornwall, 60, 119, 158, 161–2, 219, 368, 372, 452
Cumberland, 8
Derby, 65, 306
Devon, 86, 159, 161, 212, 219, 237, 371, 411, 451
Dorset, 159, 370, 384, 413
Essex, 311, 380
Flint, 138
Glamorgan, 159, 163, 280, 413, 449 (Supplement)
Gloucester, 306, 346, 407
Hants, 32, 71, 72, 159, 210, 306, 344, 413
Herts, 241
Hereford, 307, 447
Kent, 131, 159, 212, 248, 278, 282, 342, 346
Lancaster, 212, 256, 381
Leicester, 160–2, 334–9, 448
Lincoln, 432
Norfolk, 43
Nottingham, 447
Oxon, 34, 449
Pembroke, 72
Radnor, 447
Salop, 411
Somerset, 25, 159, 221, 307, 343, 378, 393, 448, 449, 450, 451
Stafford, 306
Suffolk, 33, 71, 388, 412
Surrey, 164, 248, 346, 347
Sussex, 63, 66, 161–2, 277, 279, 287, 452
Warwick, 169, 171
Westmorland, 8, 163
Yorks, 39, 64, 413
See also Hieracium Notes, 109–112; Potamogeton, 172–176; Rosa, 204–210; Hepaticæ, 63, 258; Hybrids, 268–276, 296–304
Crabbe as a botanist, 77
Cratægus, N. American, 289
Crepis præmorsa, 313
Crocus nudiflorus, 450

Croton sparsiflorus, 406
Cryptogams, Disappearance of, 334
Cyanophyceæ, Studies in (rev.), 284
Cymathere, 214
Cyperus fuscus, 450
Cyphia mazoensis,* 46
Cyrtandra glabrata, 314
Cystopteris fragilis, 33, 71

Dallman, A. A., Flintshire Flora, 138; Schistostegia osmundacea, 212; Sisymbrium pannonicum, 212; Orchis pyramidalis, 381
Dasyscypha cauescens (t. 485), 169
Davey, F. H., Notes from Cornwall, 119; Euphrasia Vigursii* (t. 486), 217
Davies's 'Introduction to Botany,' 342
Dicliptera frondosa, 314
Dicranum Scottianum, 305
Dillenian Herbaria (rev.), 282
Disappearance of Cryptogams, 334
Dixon, H. N., Peristome of Splachnobryum, 82; S. delicatulum* (t. 484A), 84, 165; Fissidens algarvicus, 237; Hypnum riparium, 281; Seed-dispersal in Euphorbia Chamæsyce, 281
Dörfler's Botaniker Porträts, 287
Donax, 242; Arundastrum, 243; cannæformis,* 243
Drabble, E. & H., Lithospermum officinale var. pseudo-latifolium, 162; Fumaria Boræi, 163; Sisymbrium pannonicum, 163; Hypericum humifusum var. Liottardi, 212; Phleum pratense, 306
Druce, G. C., Plantago lanceolata var. sphærostachya, 21; Cheshire Plants, 33; Ophrys Trollii, 34; Huckleberry, 112; Alnus rotundifolia, 163; Stipa membranacea, 164; Spanish and Portuguese Carices, 211; Irish Plants, 248; Calamagrostis lanceolata, 380; his Dillenian Herbaria (rev.), 282; Kœleria, 306; Channel Islands Plants, 395, 419; Linaria arenaria, 411
Dunn, S. T., New Chinese Plants, 402
Dyschoriste alba,* 89
Dysemone, 137

Ecology of Montia, 211, 282, 306, 452
Ectocarpus Padinæ, 371
Een's Acanthaceæ, 226
Elæagnus Tutcheri,* 404
Elæophorbia, 80
Eleutheromyces longisporus, 171
Eleutherosphæra longispora*(t.485), 171
Elliott, C., 'Johns' Flowers of the Field' (rev.), 347
Elwes's 'Trees of Great Britain' (rev.), 382
Epilobium in Linnean Herbarium, 365; hybrids, 273
Erica Mackaii, 449
Erigeron, hybrid, 164
Erinus frutescens, 314; tomentosus, 315
Eriosphæra Oculus-cati, 76
Erythræa capitata, 71
Euclea Eylesii,* 47
Euphorbia Chamæsyce, 281; imbricata, 58; Peplis, 158
Euphorbias, succulent, 212
Euphrasia Vigursii,* (t. 486), 217; hybrids, 276

Fernald, M. L., Dr. Sarrasin, 117
Fissidens algarvicus, 237
Flintshire, Flora of, 138
Fockea capensis, 75
Formosa plants, 80
Fumaria hybrid, 120; Boræi, 163

Gall-formation in Ramalina, 344
'Garden Anthology,' 287
Gardenia lanciloba,* 264; pomodora,* 264
Gardner's 'Cytological Studies' (rev.), 284
Geldart, A. M., Cystopteris fragilis, 71
Geopanax, 80
Gepp, A., Christensen's 'Index Filicum' (rev.), 35; Catalogue of British Mosses (rev.), 416
Gepp, A. & E. S., 'Postelsia' (rev.), 121; Cytology of Cyanophyceæ (rev.), 284; E. A. L. Batters (portr.), 385
Gepp, E., Cymathere, 215
Gerard on Climbing Plants, 125
Germination of Poplars (t. 487), 417
Gibson's (Jost's) 'Plant Physiology' (rev.), 310
Gilbert, E., British Rubi, 129, 339
Glamorgan, Flora of (rev.), 413 (Supplement)
Glück's 'Wasser- und Sumpfgewächse' (rev.), 73

Glyceria Foucaudii, 210; pedicellata, 162
Gooseberry Disease, 168,214,256,312
Gordon's British Grasses (rev.), 349
Gregory, E. S., Seed Production in Violets, 155; Pollen of hybrid Violets, 377
Griggs on Cymathere, 214
Grimmia maritima, 305
Groom, Percy, 'Der Einfluss des Klimas' (rev.), 307
Grove, W. B., Three Ascomycetes (t. 485), 169
Groves, H. & J., Ononis reclinata, 280; Ranunculus divaricatus, 379; R. tripartitus, 452
Grumilea saltiensis,* 44
Gymnadenia × Le Grandiana, 278

Hallieracantha, 384
Haloragis, 135; simplex,* 136
Halorrhagaceæ, Note on, 135
Hanbury, Sir Thomas,† 216
Heath's Postcards, 213
Hecatonema diffusum, 370; globosum, 369,—var. nanum,* 370
Helleborine, 283; longifolia,* 441
Hemsley, W. B., Notes from Cornwall, 60
Henry's 'Trees of Great Britain' (rev.), 382
Henslow's 'Ecology' and 'Wild Flowers' (rev.), 249
Hepaticæ, British, 63, 258
Herbaria, The Dillenian (rev.), 282
Hind's Suffolk Flora, Notes on, 388
Hieracium anfractum subsp. cacuminatum, 111; britannicum var. ovale,* 109; ciliatum var. venosum,* 109; conspersum, 111; Notes, 108; ornatum, 112; pinnatifidum, 110; scanicum, 111; serratifolium var. Cinderella,* 109; of Perth and Aberdeen, 293; hybrids, 274
Hill, A. W., appointed to Kew, 352; hybrid between Cowslip and Oxlip, 384
Hoare's 'Flowering Trees,' 416
Holmes, E. M., Callymenia Larteriæ* (t. 484 B), 85; his herbarium, 79
Holtermann's 'Einfluss des Klimas' (rev.), 307
Hope's (John) Records, 454
Horwood, A. R., Disappearance of Cryptogams, 334; Exchange Club for Lichens, 412
"Huckleberry," 112
Hulme's 'Wild Flowers' (rev.), 251
Hybrids among British Phanerogams, 268, 296; between Cowslip and Oxlip. 384; Berberis, 393
Hypericum humifusum var. Liottardi, 212
Hypnum riparium, 281
Hypoestes toroensis,* 92

Ilysanthes albertina,* 331
India, Imperial Gazetteer of, 255
Indokingia, 80
Ingham, W., Sagina Reuteri, 413; Lachnea hirto-coccinea, 413
Irish Plants, 159, 210, 248, 304, 306, 345, 346, 391, 447, 449, 450
Isoglossa rungioides,* 333

Jacaranda Roberti,* 405
Jackson, A. B., Berks and Hants Rubi, 72; Silene conica, 347
Jasminum abyssinicum, 48
Johns' 'Flowers of the Field' (rev.), 347
Jost's 'Plant Physiology' (rev.), 310
Juncaceæ, hybrid, 299
Juncus pygmæus, 412
Justen, Frederick† (portr.), 62

Keeble, F., 'Plant Physiology' (rev.), 310
Kew Bulletin, 78
Kœleria, 306
Krause, K., Coffea Engleri, 197
Kuntze, Otto,† 127

Lachnea hirto-coccinea, 413
Lake District Plants, 8
Lancashire, South, Proposed Flora of, 256
Leonotis longidens,* 98
Lett, H. W., Rosa hibernica, 346
Leucæna Forsteri, 315
Ley, A., Hieracium Notes, 108; Roses of mollis-tomentosa Group, 200; Herefordshire Plants, 317; Rubus mucronatoides, 446
Lichens, Flintshire, 152; rare, 345 Disappearance of, 337; Exchange Club, 412
Limonia ugandensis,* 61
Limonium, Notes on, 24; bellidifolium, 428; binervosum,* 24, var. humile,* 25; recurvum, 412
Limosella aquatica, 449
Linaria arenaria, 411, 451; supina, 161
Lindernia Gossweileri,* 87

Linnæus, Memorials of, 383
Linnean Society, 75, 125, 167, 254, 286; Bicentenary Celebration, 286; Journal of, 384
Linton, E. F., Hybrids among British Phanerogams, 268, 296; Orchis ericetorum, 344; Spergula arvensis var. nana,* 380
Liparis Loeselii, 449
Lister, A. & G., Synopsis of Mycetozoa, 176
Lithospermum officinale var. pseudo-latifolium, 162
Livett, M. A. G., Schœnus nigricans, 307
Lock's 'Variation' (rev.), 165
London Botanic Gardens, 255
Lophocolea alata, 260
Lophozia badensis, 63; Baueriana, 258
Lotsy's 'Progressus Rei Botanici' (rev.), 38, 252, 352
Loxostigma aureum,* 403
Lycopodium clavatum, 451
Lyonsia Brownii,* 235; straminea, 235
Lysimachia pacifica, 315

Macfarlane, J. M., Notes on Sarracenia, 1
Macvicar, S., British Hepaticæ, 63, 258
Madotheca rivularis var. simplicior, 262; var. færoensis, 263
Marattia terminalis, 315
Marshall, E. S., Carex Pairæi, 163; Hybrid Erigeron, 164; Glyceria Foucandii, 210; Somerset Plant-notes, 229; British Rubi, 248; Box in England, 346; Carex and Epilobium of Linnean Herbarium, 363; Ophrys Trollii, 378; Berberis Hybrid, 393
Massee's 'Plant Diseases,' 214
Masters, M. T.† (portr.), 257
Melvill, J. C., Erythræa capitata, 71
Mentha hybrids, 276
Miehe's 'Die Selbsterhitzung des Heus' (rev.), 122
Miller, W. F., Colchicum variegatum, 411
Miller's (J. F.) drawings, 314
Mimulopsis Bagshawei,* 90
Mimulus Langsdorffii, 161
Molisch's 'Purpurbakterien' (rev.), 350
Monechma eremum,* 231; platysepalum,* 231
Montia fontana, Ecology of, 211, 282, 306, 452
Moore, Spencer, Alabastra Diversa, 41, 87, 226, 263, 329, 404; African Rubiaceæ, 114, 197; African Gamopetalæ, 154, 226, 263, 329; S. American Plants, 404
Moss Exchange Club Report, 352
Mosses of Flint, 151; of Essex, 215; Herefordshire, 326; Census Catalogue, 416
Motley's Herbarium, 71
Mycetozoa, Synopsis of, 176
Mycological Society, Transactions of, 311, 350
Myosotis palustris, 412

Nation, William,† 455
Neoschimpera, 80
Nepeta Glechoma, 162
Newspaper Botany, 80, 216
Nicholson, W. E., Cephaloziella patula, 279
Nitella ornithopoda, 167; American, 123
Nomenclature, Vienna Rules for, 26; of British Plants, 99, 162, 163, 240, 433; of Desmids, 128; a point in, 244
Nordstedt, Nomenclature of Desmids, 128
'Norges Flora' (rev.), 120
Notonia opima,* 329

Obituary:—
Batters, Edward Arthur Lionel (portr.), 385
Brandis, Sir Dietrich, 288
Brown, Robert, 126
Churchill, George Cheetham, 40
Hanbury, Sir Thomas, 216
Justen, Frederick (portr.), 62
Kuntze, Otto, 127
Masters, Maxwell Tylden, 257
Nation, William, 455
Pfitzer, Ernest, 40
Somerville, Alexander, 288
Thompson, Rachel F., 78
Wood, Emily Margaret, 458
Œnothera ammophila, 222; biennis, Variations in, 353
Oldenlandia Kaessneri, 115, 198; leptophylla,* 198; pedunculata, 115; Wiedemanni, 115, 198
Ononis reclinata, 280
Ophrys muscipera var. virescens, 282; Trollii, 34, 343, 378
Orchidaceæ, Hybrid, 278, 299

Orchis ericetorum, 344; pyramidalis, 381
Ornithogalum pyrenaicum, 450
Orobanche purpurea, 72
Orthosiphon Buryi,* 233
Oxyanthus Bagshawei,* 266; oxycarpus,* 265

Palms, Branching in, 380
Parasia Thomasii, 154
Parietaria officinalis, 34, 381
Parkinson's 'Paradisus,' 127
Paulson, R., Silene elongata, 445
Pavetta albertina,* 267; graveolens,* 267; lasiorachis, 115
Pearson, W. H., 77
Peirson, H., Gymnadenia × Le Grandiana, 278
Pentamisia crassifolia, 115, 198
Perrédès's 'London Botanic Gardens,' 255
Petalidium Eenii,* 227; damarense,* 227
Pfitzer, Ernest,† 40
Phæophyceæ, British, 368
Phleum pratense var. præcox, 306
Phyllody in Myosotis, 412
Piper's 'Flora of Washington,' 123
Plantago lanceolata var. sphærostachya, 21
Plectronia longistaminea, 115; microterantha, 115
Pleiocarpha Bagshawei,* 49
Polygala amarella, 39
Polygonum sagittatum, 249
Polystichum Braunii, 451
Poplars, Germination of (t. 487), 417
Populus glauca, 37
Potamogetons new to Britain, 172; altitude of, 373; hybrid, 299; alpinus × and var. lacustris, 155; Friesii ×, 175; Franchetii,* 234; floridanus, 373; Fryeri,* 234; gracilis, 173; intermedius, 174; lucens, 374; mascarensis, 376; nitens var. maximus,* 173; obtusifolius var. fluvialis, 176; ocreatus, 375; pectinatus var. salina, 174; praelongus, 175; pusillus var. acuminatus,* 173; × ripensis, 375; Robbinsii, 376; salignus, 212; spathulæformis, 376, 453; × Tiselii, 173; upsaliensis, 175; × venustus, 375
Primula hybrids, 275, 384
Prionolobus striatulus, 65
Prunus Fordiana,* 402; marginata,* 402
Psychotria albidocalyx, var., 116
Pyrus hybrids, 273
Ramalina, Gall-formation in, 344
Randia acutidens var. laxiflora,* 403
Ranunculus divaricatus, 379; tripartitus, 161, 452
Raphionacme Bagshawei,* 50
Rayner, J. F., Vicia bithynica, 413
Reid's 'Scots Gardiner,' 127
Rendle, A. B., Report Bot. Dept. Brit. Mus., 29, 408; 'Progressus Rei Botanici' (rev.), 38, 252; Glück's 'Wasser- und Sumpfgewächse' (rev.) 73; 'List of Seedplants,' 99, 126, 433; 'Sukkulente Euphorbien' (rev.), 212: 'Memorials of Linnæus,' 383
Reviews:—
Index Filicum. C. Christensen, 35
Indian Trees. D. Brandis, 36
Progressus Rei Botanici. J. P. Lotsy, 38, 252
Ueber Wasser-und Sumpfgewächse. H. Glück, 73
Manual of New Zealand Flora. T. F. Cheeseman, 74
Haandbog i Norges Flora. A. Blytt & O. Dahl, 120
Postelsia, 121
Die Selbsterhitzung des Heus. H. Miehe, 122
Flora of State of Washington. C. V. Piper, 123
Variation, Heredity, and Evolution. R. H. Lock, 165
Sukkulente Euphorbien. A. Berger, 212.
Plant Ecology. G. Henslow, 249
Wild Flowers. F. E. Hulme, 250
Wild Flowers. G. Henslow, 252
The Dillenian Herbaria. G. C. Druce, 282
Cytological Studies in Cyanophyceæ. N. L. Gardner, 284
Der Einfluss des Klimas. C. Holtermann, 307
Plant Physiology. L. Jost (transl.) R. J. Harvey Gibson, 310
Flowers of the Field. C. A. Johns, 347
Wild Flowers of the British Isles. H. I. Adams, 349
Manual of British Grasses. W. J. Gordon, 349
Die Purpurbakterien. H. Molisch, 350
Trees of Great Britain and Ireland. H. J. Elwes & A. Henry, 382

Flora of Glamorgan. A. H. Trow, 413
Principles of Horticulture. W. M. Webb, 415
Reinkultur. O. Richter, 453
Rhizocarpon Lotum, 35
Riccia Huebeneriana var. pseudo-Frostii, 63
Richter's 'Reinkultur' (rev.), 453
Riddell, Maria, 118
Riddelsdell, H. J., Flora of Glamorgan (Supplement); Parietaria, 34; Caermarthen Plants, 71
Ridley's Malayan Flora, 384
Riley, L. H., Ecology of Montia fontana, 211
Rogers, W. M., Plants of Lake District, 8; British Rubi, 210
Rolfe, R. A., Donax and Schumannianthus, 242; Ophrys muscifera var. virescens, 282
Rosa, Mollis-tomentosa group of, 200; hybrids, 272; arvatica, 221; Andrzeiovii, 207; cinerascens, 209; cuspidatoides, 209; farinosa, 209; hibernica, 304, 345; oblita,* 201; mollis, 204; obovata,* 204; omissa, 205; pomifera, 204; pseudomollis,* 205; scabriuscula, 208; Sherardi, 207; suberecta,* 206; submollis,* 205; sylvestris, 208; tomentosa, 208; uncinata,* 207; Woodsiana.* 208
Rubi, Berks and Hants, 72; Herefordshire, 318; Notes on British Suberecti, 129, 211, 248, 339; hybrid, 271
Rubiaceæ, African, 114, 197
Rubus fissus, 131; Idæus, 131; integribasis, 134; lacustris,* 9; mucronatoides, 446; plicatus, 132; Rogersii, 132; suberectus, 131; sulcatus, 132
Ruelliopsis damarensis,* 277
Rumex hybrids, 296
Rylands's Diatomaceæ, 455

Saccellium, 405
Sagina Reuteri, 413
Salicornia, 224; appressa, 162
Salix hybrids, 297
Salmon, C. E., Notes on Limonium, 24, 428; Euphorbia Peplis, 158; Salsola Kali, 277; Notes on Suffolk Flora, 388
Salmon, E. S., on Gooseberry Disease, 168, 312
Salsola Kali, Forms of, 277
Sarcocephalus sambucinus, 316
Sargent, C. S., North American Cratægi, 289
Sarracenia, The name, 1; Catesbæi, 4; Drummondii, 4; minor, 6; variolaris, 6
Sarrasin, Dr., 1, 117
Saunders, J., Lycopodium clavatum, 451
Saussurea setidens,* 403
Scapania obliqua, 262
Schistostega osmundacea, 212
Schizoglossum cordatum,* 330
Schœnus nigricans, 307
Schrebera mazoensis,* 48
Schumannianthus, 242; dichotomus, 244; virgatus,* 244
Scottish Plants, 25, 35, 64, 65, 292, 306, 345, 370, 447
Scutellaria alpina, 345
Seed-dispersal in Euphorbia, 281
Seed-production in Violets, 155
Senecio × albescens, 306
Shoolbred, W. A., Scottish Plants, 292
Sideroxylon oblanceolatum,* 47
Silene conica, 347; elongata, 445
Sinclair, Archibald, 381
Sinowilsonia, 80
Sisymbrium pannonicum, 163, 212
Sisyrinchium californicum, 248
Smith, A. L., 'Die Selbsterhitzung des Heus' (rev.), 122; Gall-formation in Ramalina, 344; Rare Lichens, 345; 'Die Purpurbakterien' (rev.), 350; 'Reinkultur' (rev.), 453
Solander's MSS., 32
Somerville, A.,† 288
Sonchus littoralis, 384
Spanish Plants, 53
Spergula arvensis var. nana,* 380
Splachnobryum, Peristome of, 81; delicatulum,* (t. 484), 84
St. Brody, Dr., 487
Statice ovalifolia, 57
Stemodia tomentosa,* 315
Stewart, S. A., 416
Stipa membranacea, 164
Streblonema effusum, 372; volubile, 372
Strychnos myrcioides,* 52
Swertia angustifolia, 245

Tacsonia micradena, 316; pinnatistipula β pennipes, 316
Thompson, H. S., Vicia monosperma, 34; Scutellaria alpina,

345; Juncus pygmæus, 412
Montia fontana, 452
Thompson, R. F.,† 78
Thrincia nudicaulis,* 31
Thunbergia microchlamys,* 88
Tilia cordata, 418
Towndrow, R. F., Orobanche purpurea, 72; Cardigan plants, 72
Trow, A. H., Archibald Sinclair, 381; his Flora of Glamorgan (rev.), 413

Urtica Dodartii, 162

Vaccinium Myrtillus, 112
Vangueria Bagshawei,* 42
Verbascum hybrids, 275
Vernonia pumila, 44
Viburnum Opulus, 161
Vicia bithynica, 413; lanciformis, 55; monosperma, 34
Violets, Seed-production in, 155; hybrid, 270; pollen of hybrid, 377
Vitex Eylesii,* 154

Wainwright, T., Linaria arenaria, 451
Waltham's coloured photographs, 128
Watson Exchange Club Report, 166, 256
Weathers, J., 'Horticultnre' (rev.), 415
West, W., Montia fontana, 282
Wheldon, J. A., S. Lancashire notes, 381
White, J. W., Aceras anthropophora, 343; Ophrys Trollii, 343; St. Brody's work in Gloucestershire, 407; Limonium recurvum, 412
Williams, F. N., 'Variation, Heredity, and Evolution' (rev.), 165; his Flora Gambica, 126
Wilson on the Primrose, 215
Witches' Broom, 254
Wollaston's Ruwenzori plants, 351
Wood, E. M.,† 454
Woolward, F. H., Germination of Poplars (t. 487), 417

ERRATA.

P. 25, top line, for "5" read "6."
P. 28, l. 4 from bottom, for "more" read "now."
P. 33, l. 2 from top, for "47" read "42."
P. 85. In Explanation of Plate, figs. 1, 2 should be × 50, figs. 3–5, × 250.
P. 94, l. 23 from top, for "isotjensis" read "Eylesii" (see p. 154).
P. 96, ll. 15, 16, 29 from bottom, transpose "anticum" and "posticum."
P. 133, l. 7 from bottom, for "Costa" read "Coste."
P. 236, l. 11 from bottom, for "521" read "321."
Pp. 331–333, for "Lake Albert Edward" read "Lake Albert."
P. 343, l. 16 from bottom for "Hegenb." read "Hegetschw."
P. 366, l. 5 from bottom, for "russa" read "ruffa"; l. 15 for "Nasselquist" read "Hasselquist."
P. 382, l. 6 from bottom, for "manifest" read "wanting."
P. 405, l. 13 from top, for "Oran" read "Salta."

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A FLORA OF GLAMORGANSHIRE.

By H. J. RIDDELSDELL, M.A.

The following list of the flowering plants and vascular cryptogams of Glamorganshire (v.-c. 41 of Watson), proceeds, wherever possible, upon the lines of my own observations. Only in very rare cases is the history of a plant's discovery touched upon. Nearly all occurrences which I have established myself are given on that authority alone, regardless of previous records. On the same principle, records of plants seen in herbaria are preferred to mere written records. The list has, therefore, in the main, a personal character. Plants or localities recorded otherwise than by myself bear indications to that effect.

For convenience sake the county is divided into nine districts, which mostly correspond with the drainage areas of the principal rivers. A geological arrangement would have been hopeless, in spite of the great mass of the coal measures in the northern half of the county: for the series in the other parts of the county are split up—except in the case of the Triassic series, and of the Gower mountain limestone—into very small areas. The districts are:—

1. Gower: comprising the Peninsula, and marked by the arbitrary boundary, on the east, formed by the L.N.W.R. from Mumbles Road Station to Gowerton; thence by the G.W.R. to where it crosses the county boundary at Loughor. The district has a large sea-board, and no very high hills; but a number of elevated commons in the centre and west, and a great range of limestone sea-cliffs, with numerous bays and extensive sandy burrows. The old red sandstone occurs in large patches on Cefn Bryn, Rhosili Down, &c.: the coal measures occupy the whole eastern part of the district: otherwise the soil is the mountain limestone.

2. Loughor: A narrow strip bounded on the south by a line running from the summit of Swansea Town Hill westwards to a point about one-third of a mile north of Dunvant Station of L.N.W.R. The eastern boundary begins at Penller Castell on the Caermarthenshire border, and follows the watershed over Mynydd Gwair, just east of Llangyfelach Church, over the Cockett Tunnel. It is confined to the coal measures, which rise to 1226 ft. at Penller Castell.

3. Tawe: The eastern boundary proceeds from a point in the Glamorgan-Brecon border very close to where the latter is crossed by the Neath and Brecon Railway, passes over the summit of Farteg Hill, through Cil-y-bebyll and west of Mynydd March Hywel; and goes south and south-west to the slope of Mynydd Drymau, through Skewen and along the road to Briton Ferry Road Station and the sea. It is all comprised within the coal measures, and includes the famous Crumlin Bog and the sands of Swansea Bay.

4. Neath: Including a small portion of the millstone grit, but otherwise limited to the coal measures. The east boundary goes from a point on the Brecon border within a mile of Hirwaun Ponds, due south on to Hirwaun Common; thence turns west over the highest ground in the county (Carn Fach, 1969 ft.) above Craig-y-llyn, and follows the old mountain road, Cefn ffordd, over Cefn Grog; south-west and west over Cefn Mawr, keeping above Glyn Corwg and Cwm Blaen Pelena; and from Cefn Morfydd takes an arbitrary line south-west to the point of Baglan Bay.

5. Afan: again mostly on the coal measures, which consist of lofty hills cut up by densely populated colliery valleys, and fronted by a considerable width of marsh, and extensive burrows. East and south it is limited by a line drawn from Carn Fach southwards to about Graig Fawr at Treorchy; there it turns westward sharply to the tunnel near Spelter, and takes an irregular southward direction over Rhiw Tor Cymry, past Twmpath Diwlith; and so follows the mountain road to the G.W.R. above Laleston. Thence it follows the railway to Pyle, and turns through North Cornely to the sea at Sker Point. The glacial gravel drift is found at the foot of the hills between Margam and Kenfig; Sker Point itself is composed of a conglomerate limestone belonging to the Triassic series; and very small portions of the lias and mountain limestone come in at Pyle.

6. Ogmore or Ogwr: including colliery districts, a narrow band of millstone grit and some mountain limestone tracts (Ewenny Down, Stormy Down, Porthcawl, &c.), and a good part of the lias of the Vale of Glamorgan with Bridgend as centre. Glacial drift, the alluvium of the river beds, and a large tract of blown sand at Porthcawl, complete the tale. The eastern boundary goes from Graig Fawr, Treorchy, over Mynydd William Meyrick above the sources of the Ogwr Fach to the top of Mynydd Maendy; thence to Mynydd Garth Maelwg, and past Llanharan and Llanilid by the road to Nash; and westwards through Wick to the sea at Whitmore Stairs.

7. Ddaw: which lies mostly in the Vale on the beds of the Triassic series, with, however, considerable tracts of glacial drift, patches of mountain limestone at St. Hilary, &c., and traces of the old red sandstone. It marches with district 8 from a point near Llanilid, through Ystradowen, Welsh St. Donat's, Bonvilstone, St. Nicholas, Leckwith, to Lavernock Point, and includes the Flat Holm. The only considerable centre of population is Barry. There are no high hills.

8. Taff: the largest of the districts, comprising the drainage areas of the Taff and Ely Rivers. Its northern boundary follows the county line till within a mile or two of the River Rhymney; and the eastern boundary runs over Gelligaer Hill nearly to the church; thence to Eglwysilan Hill, keeping a sinuous line over the summit between Pontypridd and Senghenydd, and so to Caerphilly Common. It then takes the Cardiff Road as far as Whitchurch, and so strikes south-east to Roath and the Bristol Channel. The greater part of the area is on the coal measures, but millstone grit, limestone, and a small quantity of old red sandstone occur near Merthyr Tydfil, and a band of limestone again at Taffs Well and along the line of hills which continues through district 9 past Llanishen. The Rhaetic beds, lias, and old red sandstone all appear in the country north of Cardiff, and the gravel drifts cover considerable areas in the same district.

9. Rhymney: A very narrow strip lying between district 8 and the Rhymney River. The greater part is on the coal measures; but the lower part from Caerphilly downwards comprises the limestone hills of Llanishen and Rudry, the underlying old red sandstone, a small area of the Ludlow beds about Penylan and Roath, and a considerable acreage of gravel drifts, as well as the interesting marshes at the mouth of the Rhymney River.

The chief authorities quoted for records are:—

Ray: John Ray's Cat. Plant. Angl. 1670, Synopsis 3rd edit. 1724, and account of his Third Itinerary in 1662 (edited in the 'Memorials of John Ray,' by Edwin Lankester).

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Brit. Ass. Handb.: British Association Handbook (Cardiff), 1891.
Rhondda Fl.: Flora of the Rhondda Valley, by H. Harris, 1905.
Cardiff Nat. Soc. Proc.: Cardiff Naturalists' Society's Proceedings.
Swansea Sci. Soc. Proc.: Swansea Scientific Society's Proceedings.
Lloyd: MS. lists of Porthcawl and Mumbles Plants, by the late Rev. J. B. Lloyd, of Liverpool. For the loan of these I am indebted to Mrs. Lloyd.

The initials of well-known living botanists, such as the Revs. E. F. Linton, W. R. Linton, W. Moyle Rogers, Augustin Ley, E. S. Marshall, and Messrs. G. C. Druce, H. & J. Groves, C. E. Salmon, H. W. Pugsley, quoted as authorities, will be easily recognized where they occur. To these gentlemen, with many others, I am deeply indebted both for records, and for assistance in identifying plants.

Herbaria consulted are those of the British Museum; of H. C. Watson, at Kew; of E. Downing Esq., of Barry (quoted as D.); of James Motley, of Aberafan, and J. E. Bicheno, of Swansea (both in the keeping of the Royal Institution at Swansea); and of the Cardiff Museum. Mr. Druce explored the Babington Herbarium at Cambridge for Glamorgan records; and Miss Geldart, of Norwich, has sent me some localities extracted from the Herbarium of the late H. D. Geldart, Esq. To both of them my thanks are due.

The species are, as a rule, recorded in the order of the ninth edition of the *London Catalogue*; but Rubi follow that of Mr. Rogers's Handbook, and Hieracia that of Mr. Linton's. The nomenclature for species is that of the *List* prepared by Mr. Britten and Dr. Rendle and issued by the Trustees of the British Museum. The numerous aliens found in the county will form the subject of a separate paper.

Forms recorded, as I believe, in error or on insufficient evidence, are placed in brackets.

Names of native species which are not recorded as native, or as certainly native, in Top. Bot., are starred.

RANUNCULACEÆ.

Clematis Vitalba L. 1. Oxwich, behind the Rectory. Between Swansea and Penrice, and Tresilian, *Wats. Geogr. Distr.*; probably this district. 4. Jersey Marine. 5. Baglan. 6. Ewenny. 7. Frequent along the whole coast line; and for some miles inland towards Cowbridge, Dinas Powys, &c. 8. Frequent off the coal measures. 9. Llanedan, Cefn On, Rudry, Ruperra, and near Llanishen Tunnel.

**Thalictrum dunense* Dum. 1. Llanmadoc, see *Rep. B. E. C.*, 1905, p. 151. 6. In Cardiff Nat. Soc. Proc. for 1891–2, A. H. Trow records "*T. minus*" from Porthcawl: mostly likely this segregate.

T. collinum Wallr. 4. Craig-y-llyn, in plenty. 8. Graig Fawr,

Treorchy. The record in Dillwyn, p. 42 (as *T. minus*), is almost certainly from Breconshire.

T. flavum L. 6. Mouth of the River Ogmore: apparently var. *riparium* Jord.

Anemone nemorosa L. 1. Scattered. 2. Penllergaer (Swansea Sci. Soc. Proc. 1895-96). 3. Woods about Bryn Mill, *Wats. Geogr. Distr.* 4. Glyn Neath, Resolven, Rhigos Hill. Perddyn Gorge. 6. S. Cornely, Ewenny. 7. Wenvoe. 8. Frequent in woods and on the site of former woods. Occasionally *fl. purpureo*, as at Aberdare.

Ranunculus divaricatus Schrank. 3. Crumlin Burrows, *Flower & Lees.* 4. About Neath, *Flower & Lees.* Canal at Glyn Neath and Resolven. 5. Kenfig Pool. 8. Cardiff and Penarth, rare, *Storrie.*

(*R. fluitans* Lam. All records, *e.g.* Storrie's from the Taff, Ely and Rumney Rivers, must be considered uncertain or erroneous.)

**R. pseudo-fluitans* "Bab." Hiern. 2. *Dillwyn*, p. 39, "*R. fluitans* of Babington in Loughor River above Pontardulais": perhaps this species is meant. 8. Cardiff feeder, *Hb. Cardiff.*

**R. trichophyllus* Chaix. 1. Llangenydd marshes. 7. Cowbridge.

(*R. Drouetii* F. Schultz. 7. Cowbridge; specimens doubtfully placed here by H. & J. G.)

**R. heterophyllus* Web. ex p. 1. Oxwich Marsh. 5. A specimen in Hb. Motley from Kenfig Pool is thus named, 1842. 6. Porthcawl. Ewenny wood, *Hb. Cardiff.* 8. Cardiff, *Hb. Cardiff.*—Var. *submersus* (Hiern). 7. Cadoxton.

**R. peltatus* Schrank. 1. Small form at Pitton; Paviland, Oxwich, Rhosili Down. 2. Penllergaer, Pantyffynon to Pontardulais. 3. Crumlin Bog and Tennants Canal, plenty. 4. Llynfach and Llynfawr, Neath, Resolven, Jersey Marine. 5. Kenfig Pool (*Hb. Motley*, probably this, *fide* H. & J. G.). 6. Newton sandhills. 7. Cowbridge. Barry, *D.* 8. Welsh St. Donat's. A river form at Peterston, in River Ely. Llandaff, *Hb. Cardiff.*—Var. *truncatus* (Hiern). 3. Crumlin Bog. 5. Kenfig Pool.—Var. *penicillatus* (Hiern). To this var. are probably to be assigned all the records of *R. fluitans.* Messrs. Groves have placed here specimens from 6. Ewenny Bridge. 8. Canal at Penrhiwceiber. 9. Caerphilly, stream by the castle.

**R. Baudotii* Godr. 1. Frequent in the marshes and on the burrows from Oxwich to Llanmorlais. 2. Loughor marshes. 5. Port Talbot, Aberafan, Kenfig Pool. 7. The Leys, Cadoxton. 8. Cardiff Docks, Pengam marshes, Grangetown. Penarth Road, Cardiff, *Hb. Cardiff.*

**R. lutarius* Bouv. 1. Rhosili Down in some quantity. (8. Storrie's records are probably in error for *R. Baudotii.*)

R. Lenormandi F. Schultz. Frequent in districts 1, 2, 3, 4, 5, 8, 9. Among the hills occurs a form approaching *R. lutarius* in its more deeply divided upper leaves, and cup-shaped flowers. 1. At Rhosili, a plant which Messrs. Groves suggest is a hybrid *R. Lenormandi* × *lutarius*, growing with both species.

R. hederaceus L. 1. Frequent at the sea level, on the sands and elsewhere; also on the downs; often with *R. Lenormandi.* 2. Loughor, Mynydd Garn Goch. 3. Crumlin Bog and the enclosing hills, but

not much. 4. Neath, *W. M. R.* Crumlin Bog, hills above River Perddyn. 5. Baglan, Aberafan, and Margam moors. 7. Aberthin. Barry, *D.!* 8. Near Aberdare. About Cardiff, *J. Bot.* 1884 p. 257. 9. Penylan, *Storrie*; Craig Llanishen.

R. sceleratus L. 1. Gowerton, Salthouse Point, Llanrhidian, Llanmadoc. 2. Loughor marshes, Pontardulais. 3. Crumlin Bog. 4. Neath. 5. Baglan, and Margam moors. 7. Cadoxton. 8. Canal Aberdare to Penrhiwceiber. Grangetown, and East Moors, Cardiff. Other places about Cardiff, *Storrie*. St. Fagan's, *D.!* Various parts of the Rhondda Valley, *Rhondda Fl.*

R. Flammula L. Common.—Var. *radicans* Nolte. 4. Pontneddfechan, *Hb. Mus. Brit.* 5. Kenfig. 6. Porthcawl sandhills. 7. Aberthin. 8. Welsh St. Donat's.

R. Lingua L. 1. Penmaen, *Swansea Sci. Soc. Proc.* 1893; probable error. 3. Crumlin Bog and Tennants Canal in plenty. 4. Neath Canal, *Flower*. Crumlin Bog, Resolven. 5. Kenfig Pool, *Gutch*; now gone. 7. "In a wet marshy meadow on the left going to the Mill" from Cowbridge, *Lightf.* 1773. St. Hilary, *Cardiff Nat. Soc. Proc.* 1882. 8. Talygarn, *W. F. Evans*. Near Coedriglan, *Storrie*.

R. auricomus L. 3. Frequent in the woods about Swansea, *Flower & Lees*. 7. Dinas Powys, Cadoxton, and Wenvoe, wood borders and hedges. 8. Caerau, and Melingriffith, *Storrie*.

R. acris L. Probably general; ascending to the high mountain cliffs of Glyn Neath and Treorchy. Recorded from all districts. Our most frequent forms are :—

Var. *Borœanus* Jord. 1. Llanmadoc and N. Gower. 3. Swansea to Killay. 4. Glyn Neath. 5. Port Talbot. 8. Aberdare and neighbourhood.—f. *tomophyllus* (Jord.). 4. Glyn Neath. 7. Barry. 8. Aberdare, Mountain Ash.—Var. *rectus* (Bor.). 8. Aberdare, Hirwaun.—Var. *Steveni* (Andrz.). 1. Penard, *G. C. D.* 8. Aberdare.

R. repens L. Common; rising to the high mountain cliffs of Craig-y-llyn.

R. bulbosus L. 1. Rhosili, Whitford Burrows; the common buttercup of the limestone cliffs near Worms Head. Oxwich, *S. W. Jenkins*. Penmaen, *Swansea Sci. Soc. Proc.* 1893. 2. Loughor marshes. 3. Sketty and the Burrows. Crumlin Burrows, &c. Danygraig, Swansea, *Gutch*. 4. Glyn Neath, Rhigos Hill, Pontneddfechan. 7. Barry Island, Porthkerry, Cold Knap, Sully and Island, Marcross. 8. Plenty. 9. Lisvane, *Hb. Cardiff*.

**R. parviflorus* L. 1. Cliff at Penard, the Tor and other cliffs at Llanmadoc, Whitford Burrows. 6. Coast, Sully to Southerndown, *Storrie*. 7. Sully Island, Swanbridge Cliffs, Dinas Powys, Fontigary. 8. Penarth, *Hb. Cardiff*.

R. Ficaria L. Probably general; but no records for district 9, and few for 2, 3, 5, 6. Frequently fruiting at Aberdare.

Caltha palustris L. Generally distributed in suitable spots, which include hollows of sandhills by the sea (*e. g.* 1. Whitford Burrows), and the swampy parts of the upland moors; not however rising much above 800 ft.—Var. *Guerangerii* Bor. 3. Crumlin Bog, scarce. 8. Hirwaun, Nant Hir, near Aberdare. 9. Llanishen, *Hb. Cardiff*.

Trollius europæus L. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–96. 3. Ystradgunlais, *Gutch.* This is probably in Breconshire. 4. Frequent. 8. About Aberdare not uncommon, Pant, &c., near Merthyr. Frequent, Ely and Taff Valleys, St. Fagan's, *Storrie.* Llandaff, *H. S. Thompson* in litt. 9. Cefn Mable, *Hb. Cardiff.* Pwllypant, *Storrie.* A plant of the hill country, but not found on the highest ground.

**Helleborus fœtidus* L. Native in district 1 at Parkmill. Probably introduced elsewhere, as at 6. Dunraven woods, *Cardiff Nat. Soc. Proc.* 1876. 7. St. Hilary, *do.* 1882; Sully House Copse, *do.* 1876. 8. Reported by B. A. Williams from the hill by the tunnel near Merthyr Tydfil.

Aquilegia vulgaris L. 1. Rhosili and neighbourhood. Oxwich Bay, *Ley.* Penmaen, *Swansea Sci. Soc. Proc.* 1893. Near Mincian Hole, *Gutch.* Near Pengwern Common. 2. Pantyffynon. 5. Pyle. 6. Southern Down, *W. Cook.* 7. Ystradowen, Llandough, newly-made road at Barry. Dinas Powys, *D.* Llwydcoed and Merthyr, not native. Forest wood, Ystradowen, Garth Wood, &c., near Taffs Well. Llantwit Fardre, *D.* 9. Lisvane, plenty. Wood on Craig Llanishen.

**Aconitum Napellus* L. 1. Native in wood, Penrice. Field corner, Llanmadoc, escape. Nicholaston woods, not native, *Dillwyn.* 2. Penllergaer, not native, *Dillwyn.* 6. Merthyr Mawr, escape. 8. Peterston Moor, over a large area, native; and other parts of the Ely Valley, cf. *J. Bot.* 1905, p. 91, and *B. E. C. Rep.* 1904. Storrie says it is common in the Taff Valley, and 9, in the Rumney Valley. Woods near Caerphilly, *H. S. Thompson* in litt. Copse near Roath Park, looking native.

Nymphæaceæ.

Nymphæa lutea L. 1. Planted, Oxwich, *S. W. Jenkins.* Pool, Oystermouth, *Wats. Geogr. Dist.* 2. Penllergaer. 3. Crumlin Bog, *Wats. Geogr. Dist.* 4. Llynfawr and Llynfach, *Storrie.* Vale of Neath, *Wats. Geogr. Dist.* 7. Cwrtyrala, *Storrie.* 8. Coedriglan, *Storrie.* Some of these refer to introductions; the species is probably native in district 3.

Castalia alba Greene. 1. Oxwich Bay. 2. Penllergaer. 3. Crumlin Bog, plenty; this record dates from Lightf. 1773. Briton Ferry Canal, *Wats. Geogr. Dist.* 4. Llynfawr. Llynfach, *Storrie.* Resolven, Aberdylais, Jersey Marine in the Canal. 5. Kenfig Pool, *Hb. Motley,* ? disappeared. 6. Porthcawl, *Lloyd.* This may refer to Kenfig Pool. 7. Cwrtyrala, *Storrie.* Llandough near Cowbridge. 8. Coedriglan, *Storrie.*

Papaveraceæ.

Meconopsis cambrica Vig. 2. Penllergaer, escape, *Swansea Sci. Soc. Proc.* 1895. 4. River Perddyn. Plentiful about Pontneddfechan, Aberdylais, *B. G.* 8. Coedriglan, escape, *Storrie.*

Glaucium flavum Crantz. Once much commoner, especially in Swansea Bay. 1. Penclawdd and Salthouse Point. Three Cliffs Bay to Port Eynon. Rhosili, *Herb. Mus. Brit.* 1895. 3. Mumbles Road, Swansea, *Hb. Bicheno.* Frequent, *Flower.* Singleton, *Gutch.*

Crumlin Burrows. 4. Briton Ferry, *Nicholson*. 5. Baglan, *R. G. Llewellyn*. Aberafan, *Wats. Geogr. Distr.* Port Talbot. 6. Porthcawl to Sker. 7. The Leys, Aberthaw. Monknash, *Cardiff Nat. Soc. Proc.* 1882. Sully Island. Barry, *Storrie*. 8. Near Cardiff, *N. B. G.* Penarth, *Storrie*.

Chelidonium majus L. Seen in every district, almost always near houses. But 1, on Clyne Common, *W. M. R.*, and 5, by stream side, ditches, and roadsides between Port Talbot and Margam (where it also occurs *fl. pleno*), probably native.

Fumariaceæ.

**Corydalis claviculata* DC. 6. Southerndown, *D.* 7. Near Wenvoe, *Storrie*. 8. St. Fagan's, *Storrie*. 9. Pwllypant, *Storrie*. Caerphilly Common.

Fumaria capreolata L. 1. Often in W. Gower. Oystermouth (*Sowerby, E. B.* i. 105). 3. Swansea to Port Tennant, common, *Gutch*. 4. Glyn Neath to Pontneddfechan, *Wats. Geogr. Dist.* 7. Flat Holm, *J. Bot.* 1891, p. 345. 8. Llandaff. Storrie says it is frequent in East Glamorgan.

**F. Boræi* Jord. 5. Port Talbot, probably native. 8. Cardiff Docks.

F. confusa Jord. 1. Oxwich. Oystermouth. Langland Bay, spn ! *W. M. R.* 3. Near Swansea, *E. F. L.* 5. Port Talbot.

F. muralis (Sonder). 3. Near Swansea, *E. F. L.*

**F. purpurea* Pugsley. 5. Port Talbot. Aberafan, *Hb. Motley*.

F. officinalis L. 1. Mumbles, *Lloyd*. Paviland, *Swansea Sci. Soc. Proc.* 1892–3. 3. Common near Swansea, *Flower & Lees*. 5. Port Talbot Docks. 6. Near Porthcawl, *Lloyd*. 7. Aberthin to Ystradowen. Flat Holm, *J. Bot.* 1891, p. 345. 8. About Cardiff on ballast and waste ground, *J. Bot.* 1884, p. 257, &c. Penrhys and Blaenycwm, *Rhondda Fl.* I doubt if it is native anywhere.

Cruciferæ.

Matthiola sinuata Br. Probably extinct. Earliest record 1773, by Lightf., whose specimen is at Saffron Walden. Last record about 1848. 1 & 3. Swansea to Mumbles, *Flower*, and Eastern Pier to Crumlin Burrows, *Gutch*. B. G. even says it is "frequent . . . on the shores of this county, L. W. D[illwyn]." 4. Briton Ferry, *Lightf*.

M. incana Br. 7. Nash Point, cf. *J. Bot.* 1905, p. 217. Established for a long time; perhaps native.

Radicula Nasturtium-aquaticum Britten & Rendle. Well distributed; and common in watery places, on low ground.—Var. *microphyllum* (Reichb). 8. Aberdare.

R. sylvestris Druce. 1. Penclawdd. 3. Banks of Neath Canal, *Gutch*. 4. Aberdylais. 7. Barry and thence to Bonvilstone. 8. Cardiff to Penarth, *D.* Ely, Leckwith, &c., *Storrie*. Pontrhondda, Pontygwaith, &c., *Rhondda Fl.*

R. palustris Moench. 3. St. Helens, Swansea. Banks of Neath Canal, *Gutch*. 4. Neath Canal and Gilfach, *W. M. R.* 5. Aberafan to Baglan. Margam marshes. 7. Flemingstone Moors. 8. About

Aberdare in the meadows and by the canal, Taffs Well, Peterston Moor, Llantrissant. Pontrhondda, Pontygwaith, &c., *Rhondda Fl.* Cardiff Canal, *Hb. Cardiff.* Ely, St. Fagan's, &c., *Storrie.*

**Armoracia amphibia* Peterm.—Var. (*Nasturtium*) *variifolium* DC. Canal bank, Aberdare, very rare.

Barbarea lyrata Asch. Recorded from all districts except no. 5; plentifully in 7 and 8.

Arabis hirsuta Scop. Local. 1. Parkmill, Nicholaston Woods. Oystermouth Castle, *B. G.* Llanrhidian, Cheriton, Llanmadoc. 3. Swansea, *Gutch.* 4. Glyn Neath, Neddfechan Glen. 5. Kenfig sandhills, *Hb. Motley.* 6. Ewenny Down. 7. Cowbridge. Llanblethian, *Storrie.* 8. Aberdare, Penydaren, Morlais Castle, Hirwaun. Cardiff, *Storrie.* Tyntyla, *Rhondda Fl.*—Subsp. *Retziana* Beurling, var. *hispida* R. & F., *fide* E. S. M. 6. Sandhills, Newton Nottage. Named by M. Rouy.

Cardamine amara L. 8. Pontypridd, spn! *Hb. Cardiff.*

C. pratensis L. Seen in all districts; frequent in 1, 2, 3, 4, 8. Rising to 1500 ft. at the cliffs of Glyn Neath and the Rhondda Valley.—*Fl. pleno.* 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 5. Baglan, *Mrs. Llewellyn.* Port Talbot.—Var. *dentata* Hayne & Welw. 1. Llanrhidian.

C. hirsuta L. Very common.

C. flexuosa With. 1. Killay, Llanmadoc, Mumbles Road. 2. Pantyffynon to Pontardulais. 3. Swansea, common, *Gutch.* Crumlin Bog, Swansea to Killay, Ystalyfera. 4. Frequent. 6. Ewenny; Merthyr Mawr. 7. Michaelstone, *Hb. Cardiff.* 8. Aberdare and neighbourhood often, Pontsarn, Cwfmparc, Ystradowen, Peterston, Llandaff, *Storrie.* 9. Llanishen, Lisvane. Llanedan and Pwllypant, *Hb. Cardiff.* Penylan, *Storrie.*

C. impatiens L. 8. Morlais Castle, very rare, 1904. Coed Cymmer, *Dillwyn*, p. 29—perhaps in Breconshire. Quakers Yard, *Storrie.*

Draba aizoides L. Native, cf. *J. Bot.* 1905, p. 91. 1. Pwlldu Head to Penard Castle. Paviland to Worms Head.

D. verna L. Local. 1. Cliffs and burrows of Gower, frequent. 2. "Hedges near Penllergaer," *Swansea Sci. Soc. Proc.* 1895–6. 3. Sketty Burrows. Old walls, Swansea, *Flower & Lees.* 4. Crumlin Burrows. 5. Sands at Port Talbot, Aberafan. 6. Ewenny Down. 7. Barry Island. Porthkerry, rare. Wenvoe. Llantrithyd, *Cardiff Nat. Soc. Proc.* 1882. 8. Morlais Castle, great quantity. Coedriglan, *Storrie.* Midrhondda, Blaencwm, Porth &c., *Rhondda Fl.* 9. Roath, *Hb. Cardiff.*

Of the named forms of this species we have:—

**Erophila virescens* Jord., *fide* E. S. M. 1. Caswell Bay, Pwlldu, Bishopston, Llanrhidian, Llanmadoc, Broughton sands, Rhosili cliffs, Penard Burrows. 3 & 4. Crumlin Burrows. 5. Sands at Kenfig, Aberafan, Port Talbot. 6. Limestone at S. Cornely. 8. Morlais Castle.

? **E. inflata* Hook. 7. Barry Island; see *Rep. B. E. C.* 1905, p. 155.

**E. præcox* DC. 5. Sands at Kenfig in no great quantity.

Cochlearia officinalis L. 1. Penard Castle westwards to Llan-

madoc. 2. Loughor marshes, *Swansea Sci. Soc. Proc.* 1895–6; probable error for *C. anglica*. 3. Banks of River Tawe between Swansea and Landore, *B. G.* 6. Sker Point, *Hb. Motley*! Porthcawl, *Lloyd*. Southerndown eastwards, *Storrie*. 7. Penarth to Southerndown, *Storrie*. Porthkerry, Llantwit Major to St. Donat's. Flat Holm, *J. Bot.* 1891, p. 345. 8. Cardiff, *Hb. Cardiff*. Penarth, *Storrie*.

C. danica L. 1. Very frequent on the Gower coast. 3. Singleton, *Gutch*. 6. N. Cornely, three miles from the sea. Candleston, Porthcawl sandhills, Ogmore Castle. Dunraven, *Cardiff Nat. Soc. Proc.* 1882. 7. Frequent. 8. Penarth, *Hb. Cardiff*.

C. anglica L. 1. Three Cliffs Bay, Llangenydd, Llanmorlais to Llanrhidian, Marsh by Whitford Burrows, Salthouse Point, Gowerton. 2. Loughor marshes. 3. Banks of River Tawe above Swansea, *B. G.* 4. Neath. 5. Port Talbot Docks. 6. Dunraven, *Cardiff Nat. Soc. Proc.* 1882. 7. St. Athan's Road. 8. Grangetown, Leckwith Bridge. Penarth, &c., *Storrie*. 9. Pengam marshes.—Var. *Hortii* Syme. 1. Llanmadoc marshes.

Sisymbrium Thalianum Gay. Very local. 1. Oxwich, Three Cliffs Bay, Mumbles Road. 2. Hedges Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Swansea, *Gutch*. 4. Glyn Neath, Pontneddfechan. 5. Craigafan and Aberafan, *Hb. Motley*. 6. Near Porthcawl, *Lloyd*. 8. Common about Aberdare. Hirwaun, Merthyr Tydfil, Morlais Castle, Taffs Well. St. Fagan's and Penarth, *Storrie*. 9. Penylan and Pwllypant, *Hb. Cardiff*.

S. officinale Scop. Frequent, except on high ground.—Var. *leiocarpum* DC. 4. Aberdylais. 5. Port Talbot Docks. 7. Barry. 8. Hirwaun. Cardiff Docks.

S. Sophia L. 3. Swansea, *Flower & Lees*. Port Talbot Docks. Aberafan, *Hb. Motley*. 8. Cardiff Docks. ? Native.

Alliaria alliacea Britten & Rendle. In every district.

**Brassica oleracea* L. Undoubtedly native, see *J. Bot.* 1905, p. 91. 6. Cliffs near Dunraven, *Westcombe*. 7. Barry Island, Lavernock, Aberthaw to Llantwit Major, in plenty on the lias cliffs. 8. Penarth, Lavernock. Stray at Llwydcoed.

B. monensis Huds. 1. Three Cliffs Bay, Oxwich Bay. All the records from Flower (1839) onward refer to this locality or the immediate neighbourhood. 7. Aberthaw, *Storrie*, and 8 Ballast, *Storrie*, are probable errors for *B. Cheiranthos*.

B. sinapioides Roth. 1. Frequent. 3. Rubbish heaps Swansea, *Gutch*. 5. Port Talbot. 7. Coast Swanbridge to Nash Point, frequent and native. 8. Cardiff Docks, Penarth, Llantrissant. Cf. *J. Bot.* 1905, p. 91.

B. Sinapistrum Boiss. Records from all districts except 5.—Var. *orientalis* Asch. 4. Aberdylais. 8. Cardiff Docks.

Diplotaxis muralis DC. 3. Swansea, *Gutch*. 5. Port Talbot Docks. 6. Porthcawl to S. Cornely, frequent. 8. Cardiff Docks. *Rhondda Fl.* says this is frequent in the Rhondda Valley.—Var. *Babingtonii* Syme. 1. Langland Bay, Caswell Bay, and Oystermouth, *W. M. R.* 3. Swansea, *Hb. Bicheno*. 5. Port Talbot Docks. 6. Porthcawl to S. Cornely. 8. Cardiff Docks, Aberdare. Penarth, *Hb. Cardiff*.

Capsella Bursa-pastoris Medic. In every district: perhaps generally introduced, but native on 1. Penard Burrows. 3. Sketty and Crumlin Burrows. 4. Jersey Marine.

Coronopus didymus Sm. 1. Mumbles, *Hb. Cardiff*. Killay to Penard, *G. C. D.* Langland and Caswell Bay, *W. M. R.* 3. By Crumlin Bog. Llandwr Marsh and Fabians Bay, *Gutch*. Swansea frequent, *Dillwyn*. 4. Neath, *Hb. Babington*. Cadoxton, *Gutch*. 5. Port Talbot. 6. Porthcawl and neighbourhood. 7. Cowbridge. 8. Aberdare. Cardiff, *Hb. Thos. Clark*. 9. Pwllypant, *Hb. Cardiff*. Doubtful native.

C. procumbens Gilib. Also doubtfully native. 1. Pitton, Paviland, Rhosili, Llanmadoc, Penclawdd. 3. Singleton Marsh, *Gutch*. 5. Port Talbot Docks. Pyle, *Hb. Motley*. 6. Porthcawl, frequent. 7. Many spots along the coast, Flemingstone Moors, Beaupré, Cowbridge. 8. Cardiff Docks, *Hb. Cardiff*. 9. Pengam marshes.

**Lepidium latifolium* L. 4. Neath, *Hb. Motley*. 7. St. Donat's, *Storrie*. 8. Penarth, *Hb. Cardiff*.

L. campestre Br. 1. Port Eynon. 3. Banks of Neath Canal, *Gutch*. 6. Porthcawl, *Lloyd*. 7. Barry, Cadoxton, Porthkerry. 8. Llwydcoed, railway side. "Common. Penarth, Ely, St. Fagan's, &c.," *Storrie*. 9. Pwllypant and Cefn On, *Hb. Cardiff*.

L. heterophyllum Benth. 1. Penclawdd, Paviland. 2. Loughor river gravel above Pontardulais. 3. Common at Swansea on the sea shore, *Flower*. 4. Railway side, Pencaedrain, Glyn Neath. Pontneddfechan and Pontwhalby, *Woods*. 5. Railway side between Pyle and Port Talbot. 8. Aberaman. Frequent, Cardiff and Penarth, *Storrie*. Mardy, Bodringallt, &c., *Rhondda Fl*.

Thlaspi alpestre L. 4. About Pontneddfechan and Aberpergwm, *B. G*.

Teesdalea nudicaulis Br. 3. Swansea, occasional, *Dillwyn*. ? extinct.

Hutchinsia petræa Br. Limestone rocks and sea sands; very local and scarce. 1. Penard Burrows, &c., and ruins on them. Sands at Llanmadoc. Rocks near Worms Head, Flower in *J. Bot*. 1877, p. 180.

Crambe maritima L. Extinct, I believe. 1. Rocks about Port Eynon, *B. G*. 5. Sandy shore between Neath and Afan rivers, *Gutch*. Kenfig River, *Hb. Motley*. 6. Between Sker and Porthcawl, *Dillwyn*. 7. The Leys, St. Donat's, &c., *Storrie*.

Cakile maritima Scop. 1. Swansea Bay, Oxwich, &c. Llangenydd Burrows. Whitford Burrows. Salthouse Point. 3 & 4. Crumlin Burrows. 5. Port Talbot, Margam Burrows. 6. Porthcawl sands. 7. Sully, Barry, the Leys, &c., frequent, *Storrie*. 8. Cardiff, *Hb. Cardiff*.

Raphanus maritimus Sm. 1. Shingly beach, Penclawdd. *Hb. Brit. Mus*. 1887. Perhaps native here. 5. Port Talbot. 7. Aberthaw, *Storrie*. 8. Penarth, *Storrie*. Casual at Aberdare.

Resedaceæ.

Reseda lutea L. 1. Oxwich to Port Eynon. Paviland, *Swansea Sci. Soc. Proc*. 1892–3. Llanmadoc. 3. Frequent on ballast heaps

and waste ground. 5. Port Talbot Docks. 6. Porthcawl sandhills. 7. St. Athan's Road. Barry, *D.* Cowbridge, *Cardiff Nat. Soc. Proc.* 1882. 8. Cardiff Docks. Ely, *Storrie.* Penarth, &c., *Hb. Cardiff.* 9. Llanbradach to Caerphilly.

R. Luteola L. Well distributed throughout the Districts, and native on the Gower coast and elsewhere.

CISTACEÆ.

Helianthemum marifolium Mill. Mostly on limestone sea cliffs. 1. Pwlldu to Rhosili on cliff edge and face. Langland Bay, *More.* Cefn Bryn, *Dillwyn.* And with white flowers on the Worms Head, *Dillwyn.* 2. Cockett, *Gutch.*

H. Chamæcistus Mill. 1. General along the limestone cliffs, but not quite so close to the sea as the former species. 6. Ewenny Down, a form much simulating *H. marifolium.* S. Cornely, Tythegston, Ogmore Castle. Near Porthcawl, *Lloyd.* Southerndown eastwards, *Storrie.* 7. Frequent by the coast. Also about Cowbridge. Aubrey Arms between Cardiff and Cowbridge, *W. F. Evans.* 8. Morlais Castle.

VIOLACEÆ.

Viola palustris L. 1. Fairwood Common, Killay, Rhosili and the Down, Llanrhidian. Penmaen, *Swansea Sci. Soc. Proc.* 1893. 2. Penllergaer, Loughor, Pantyffynon to Pontardulais. 3. Crumlin Bog. Pontardawe, *Swansea Sci. Soc. Proc.* 1893. 4. Frequent in the hills and at Neath. 8. Frequent in the hills. Ystradowen Moor, Welsh St. Donat's. Llantrissant and Duffrynffrwd, *Hb. Cardiff.* 9. Lisvane, Llanedan, Caerphilly Common. Llanishen, *Storrie.*

V. odorata L. Probably well distributed except on the coal measures. 1. Llanmadoc (old red sandstone). Mumbles Road. 2. Penllergaer. 3. Swansea to Killay. 5. Pyle. Graigafan, *Hb. Motley.* 6. Cornely, Ewenny. Porthcawl, *Lloyd.* 7. Ystradowen, Wenvoe, Cog. Barry, *D.* 8. Escape near Aberdare. Penrhys Road, Glyncornel Woods, &c., *Rhondda Fl.* Leckwith Woods, Welsh St. Donat's, Garth Wood, Taffs Well, Ystradowen. Cardiff, *Cardiff Nat. Soc. Proc.* 1873. Storrie's "frequent all over the district," is not, I believe, true of the "Hills." 9. Llanedan, Caerphilly, wood on Craig Llanishen, Ruperra.—Var. *imberbis* Leighton. 3. Swansea, frequent, *Flower & Lees.*—f. *alba.* 1. Parkmill, Penard Church. 5. Baglan. 6. Court Colman, *R. W. Llewellyn.* 7. Barry, *D. !.* 8. Near Ystradowen, *Mrs. Owen.* These localities are doubtfully native.

V. hirta L. 1. Limestone in Gower in plenty; and on the old red sandstone, at Llanmadoc. 5. Sands at Port Talbot in plenty, far from any limestone; sands at Kenfig. Cae Gam, Pyle, *Hb. Motley.* 6. S. Cornely, Porthcawl sands, Ewenny Down. 7. Frequent, Lavernock to Fontigary, Nash Point. 8 and 9. On the limestones.

**V. calcarea* Gregory. 6. Ogmore Down.

**V. sylvestris* Lam. 1. Shadier spots on limestone in Gower, plentiful, though less abundant than *V. Riviniana.* Seldom close to the sea. Behind Pwlldu Head, Parkmill, Llanmadoc, &c. 6. Ewenny. 7. Porthkerry, Wenvoe, Dinas Powys. 8. Morlais Castle, both on

limestone and millstone grit, Pontsarn, Taffs Well in plenty, Leckwith, near Welsh St. Donat's. 9. Between Taffs Well and Caerphilly. Caerphilly and Pwllypant, *Hb. Cardiff.*—× *Riviniana.* 8. Taffs Well, Morlais Castle.

V. Riviniana Reich. Very frequent throughout the county, ascending to the high cliffs in Glyn Neath and the Rhondda Valley. Records from all districts.—f. *villosa* Neum., W. & M. 1. Limestone in Gower.—Var. *flavicornis* Forster. The small yellow spurred form. 1. Furzy banks of cliffs in Caswell Bay.—Var. *nemorosa* Neum., W. & M. 1. Wood and lane at Llanmadoc, Parkmill, furzy heath at Broughton Bay, Pwlldu. 4. Glyn Neath, Neddfechan Glen, Perddyn Glen. 6. Ewenny. 7. Marcross. 8. Aberdare, Mountain Ash, Merthyr Tydfil, Taffs Well.

V. ericetorum Schrader. 1. Common in sand by the sea. 3. Crumlin Burrows. 4. Jersey Marine. 5. Aberafan, Sandhills Kenfig. 6. Ewenny, Candleston, Porthcawl sands. 7. Sully Island. 8. Aberdare.—× *lactea*, 1. Rhosili, fide *W. H. Beeby.*

**V. lactea* Sm. 1. Rhosili, Frog Moor. Mr. Beeby has so named the plants recorded in *J. Bot.* 1904, p. 312, as *V. stagnina* Kit.; the latter record therefore disappears.

V. tricolor L. 1. Mumbles, *Lloyd.* 3. Singleton, probably strayed, *Gutch.* Hendrefoilan, Swansea, *Hb. Brit. Mus.* 5. Port Talbot Docks. 6. Near Porthcawl, *Lloyd.* 7. Ystradowen, near Aberthin. 8. Aberdare on waste ground. Rhondda Valley, ditto, *Rhondda Fl.* Cardiff, *Cardiff Nat. Soc. Proc.* 1873. St. Fagan's, Ely, &c., *Storrie.* 9. Pwllypant, *Hb. Cardiff.*

V. variata Jord. 8. Aberdare.

V. arvensis Murr. 1. Oxwich, fields on the cliff. 3. Common near Swansea, *Gutch.* 7. Barry, *D.!* Llantwit Major to St. Donat's. 8. Waste ground, Aberdare. Peterston. Cardiff, *J. Bot.* 1884, p. 257. 9. Pwllypant, *Hb. Cardiff.*—Of the forms coming under aggregate *V. arvensis* we have *V. subtilis* Jord. 6. Porthcawl. 8. Aberdare.—*V. Desegliseii* Bor. 8. A form very close to this at Llwydcoed, Aberdare.—*V. obtusifolia* Jord. 8. Several spots at Aberdare.—*V. ruralis* Jord. 8. Llwydcoed, Peterstou.—*V. segetalis* Jord. 8. Several places about Aberdare and Hirwaun.—*V. arvatica* Jord. 8. Llwydcoed, Aberdare.—*V. agrestis* Jord. 7. Llantwit Major to Monknash. 8. Llwydcoed, Hirwaun.—*V. Timbali* Jord. 8. Plants close to this form at Aberdare. But it is doubtful if *V. arvensis* and its forms are native anywhere in Glamorgan.

V. Curtisii Forster. 1. Rhosili Bay, Whitford Burrows, Broughton sands. Penrice, *Ball.* 3. Crumlin Burrows. 4. Jersey Marine, *W. R. L.* in *J. Bot.* 1886, p. 376. Briton Ferry sands, *Lightf.* 5. Baglan, *R. G. Llewellyn!* Aberafan, Port Talbot, Kenfig sands. 6. Merthyr Mawr Warren: in one place a form with flowers almost wholly blue, but not (I think) var. *Pesneaui* Jord. Porthcawl sands. Sker, *Brit. Mus.*

**V. lutea* Huds. 4. Near Llynfach, *Storrie.* 8. Ystrad, *Hb. Cardiff.*—f. *amœna* (Symons). 8. Near Pontypridd Rockingstone, *Hb. Cardiff.*—The record in *Top. Bot.* probably refers to Dillwyn's "*V. lutea*," i. e. *V. Curtisii* Forster.

Polygalaceæ.

Polygala vulgaris L. 1. Very small form from parts of the limestone in Gower at Penard and from Rhosili to Worms Head. Type frequent. 2. Frequent. 3. Near Swansea, *E. F. L.* Banks of Neath Canal, *Gutch*. 5. Aberafan, f. 6. S. Cornely, Ewenny. 7, 8, 9. Frequent.

P. oxyptera Reich. 1. Downs near Penard Castle and frequent in other places, *Flower & Lees*. Port Eynon, Whitford Burrows. 6. Sker to Porthcawl, *J. Bot.* 1902, p. 249. 7. Wenvoe, Sully Island. 8. Morlais Castle. 9. Taffs Well.

**P. serpyllacea* Weihe. Frequent in the county.

Caryophyllaceæ.

Dianthus Armeria L. 4. Banks about Briton Ferry, *Flower*. 5. Cwmafan, *Hb. Motley*. 8. Ballast, Cardiff, *Hb. Cardiff*.

**D. deltoides* L. 9. Rhymney railway-bank at Llanishen, *Storrie*.

Silene latifolia Britten & Rendle. Frequent.—Var. *puberula* Syme. 3. Near Crumlin Bog. 5. Port Talbot. 7. Llantwit Major. Flat Holm, *J. Bot.* 1891, p. 345. 8. Welsh St. Donat's, Aberdare in plenty.

S. maritima With. 1. Frequent on the cliffs of the south and west of Gower. 5. Port Talbot. 6. Southerndown eastwards, *Storrie*. Porthcawl, *Lloyd*. 7. Barry Island, Cold Knap, Porthkerry. Flat Holm, *Hb. Br. Mus.* 8. Penarth westwards, *Storrie*. Plenty on Graig Fawr, Treorchy, in the Rhondda Valley, at 1500 ft. elevation.

S. anglica L. 1. Cornfields at Oxwich and Horton. Paviland. Port Eynon, *Hb. Brit. Mus.* 3. Fields near Swansea, *B. G.* 5. Mawdlam. Kenfig, *Hb. Motley*. 8. Frequent on ballast, Cardiff, Gabalva, *Storrie*. Very persistent in districts 1 and 5, and perhaps native.

(*S. nutans* L. 7. Llandough, Cowbridge, *Cardiff Nat. Soc. Proc.* 1882. Authority insufficient.)

Lychnis alba Mill. 1. Rhosili, native. 7. Swanbridge, native. Otherwise apparently adventitious. No records for districts 2 and 9.—×*dioica*. 5. Port Talbot. 7. Sully.

L. dioica L. General.

L. Flos-cuculi L. General and fairly frequent.

(*Moenchia erecta* G. M. & S. 8. Rare, E. Moors, *Storrie*. Needs confirmation.)

Cerastium tetrandrum Curt. 1. Pwlldu round to Penclawdd, frequent on cliffs and burrows. 3. Sketty Burrows. 4. Jersey Marine. 5. Aberafan, Port Talbot, Kenfig. 6. Porthcawl sands. 7. The Leys, Barry Island, Sully Island, Swanbridge.

C. pumilum Curtis. The only record is that of *Top. Bot. Supp.* 1905, which Mr. Bennett says refers to a plant gathered in 1885, by Rev. E. F. Linton, who, however, tells me that he cannot recollect it, or locate it.

C. semidecandrum L. 1. On sandhills, &c., from Pwlldu round to Whitford Burrows. 3. Sketty Burrows, Crumlin Burrows.

5. Aberafan, Port Talbot, Kenfig sands. 6. Porthcawl sands. 7. Barry Island. 8. Penarth, Llandaff, &c., frequent, *Storrie.*

C. viscosum L. Apparently general. — Var. *apetalum* Dum. 5. Porthcawl. 7. Barry Island.

C. vulgatum L. Recorded generally; ascending to the high mountain cliffs. — Var. *pentandrum* Syme. 1. Broughton Burrows. 5. Kenfig sands, Aberafan, Port Talbot. Fide *E. S. M.* — Var. *alpinum* M. & K., but not in its extreme form. 8. Aberdare and Cardiff Docks, not unfrequent.

(*C. arvense* L. 7. Dinas Powys, *Storrie.* Flat Holm, *J. Bot.* 1891, p. 345. 8. Penarth, *Storrie.* Frequent in Rhondda Valley, *Rhondda Fl.* Evidence insufficient.)

**Myosoton aquaticum* Moench. 3. Frequent in watery places about Swansea, *Flower & Lees.* Not accepted by Watson. 8. Peterston, rare.

(*Stellaria nemorum* L. 3. Gutch's record refers to Breconshire as it stands, though it is not impossible that the plant occurs in Glamorganshire, which is only a few miles away. *Top. Bot.* very justly queries for v.-c. 41. 8. Rare; near copper-works, Cardiff, *Storrie.* A very unlikely locality. Bodringallt Woods, 1900, *Rhondda Fl.* At present we must exclude the plant from the county list.)

S. media Villars. General and frequent; very variable. All districts.—Var. *Boræana* Jord.. 1. Frequent on the burrows and cliffs. 3, 4, 5. Sands. 6. Limestone turf, S. Cornely. 7. Barry Island. — Var. *major* Koch. 1. Wood, Llanmadoc. Near Penard, *G. C. D.*

S. Holostea L. 1, 4, 8, 9. General and fairly common. Records from all districts.

(*S. palustris* Retz. 9. "Common in wet places. Llanishen, &c.," *Storrie.* Evidence not good.)

S. graminea L. Records from all districts.—? Var. *macropetala* Wiest. See *Rep. B. E. C.* 1903. 8. Aberdare.

S. uliginosa Murr. Frequent in 1, 2, 4, 8, 9. Also in 3 at Ystalyfera. 7. Stalling Down, Cog. Barry, *D*!

Arenaria trinervia L. 1, 2, 8, 9. Well distributed. 3. Ystalyfera, Swansea to Killay. 4. Resolven, Pontneddfechan. 5. Baglan, *W. M. R.* Pyle, Kenfig. 6. Porthcawl to S. Cornely, Merthyr Mawr, Ewenny. 7. Ystradowen, Marcross, Lavernock, Barry.

A. serpyllifolia L. Found in all districts, especially on sand-dunes.—Var. *glutinosa* Koch. 1. Penard, Oxwich Bay, Rhosili.—Var. *leptoclados* (Guss.). 1. Not uncommon near the coast. 5. Pyle to Port Talbot, Mawdlam. 6. Porthcawl and S. Cornely frequent, Merthyr Mawr. 7. Barry Island, Sully Island. 8. Aberdare, Ystradowen.

Honkenya peploides Ehrh. 1. Swansea Bay, Oxwich. Paviland, *Swansea Sci. Soc. Proc.* 1892–3. Broughton Bay, Whitford Burrows, Penclawdd. 2. Marshes Loughor, *Swansea Sci. Soc. Proc.* 1895–6. 3. Crumlin Burrows. 4. Briton Ferry sands, *Lightf.* Jersey Marine. 5. Aberafan, Port Talbot. 6. Newton sandhills. Southerndown, *Storrie.* 7. Sully Island, Barry Island, The Leys.

Sagina maritima G. Don. 1. Three Cliffs Bay. Oxwich Marsh, *Hb. Br. Mus.* Worms Head and cliffs of Gower facing westward. 2. Loughor marshes. 3. Salthouse Point, *Flower & Lees.* 5. Port Talbot, *Hb. Motley.* 6. Porthcawl, *Woods.* 7. Barry Island. Sully, &c., *Storrie.*—Var. *debilis* Jord. 6. Porthcawl, apparently this var.—Var. *densa* Jord. 1. Burry Holm, apparently good samples of this var. 6. Porthcawl.

**S. apetala* Ard. Not frequent. 1. Oxwich, Gowerton to Penclawdd. Killay to Penard, *G. C. D.* 2. Gowerton Common, Penllergaer. 3. Flower & Lees' record must refer to *S. procumbens.* 6. Porthcawl. 7. Ystradowen. 8. Aberdare, Mountain Ash, Cwmparc, Ystradowen. Cooper's Fields, *Storrie.*—Var. *prostrata* S. Gibs. 1. Llangenydd. 6. Porthcawl.

**S. ciliata* Fr. 1. Plenty on the cliffs, Pwlldu to Port Eynon. Rhosili. 5. Kenfig. 6. Porthcawl. 8. Aberdare.

S. procumbens L. Very common, ascending well up the hills.

S. nodosa Fenzl. 1. Oxwich and Penard Burrows, Whitford Burrows. 3. Sketty Burrows, *Flower.* 5. Sand all along the coast. 6. Porthcawl sandhills. 8. Taffs Well, *Storrie.* 9. Caerphilly Common, *Storrie.*—f. *glandulosa* Bess. 5. Near Port Talbot, Morfa, Margam Moors.

Spergula arvensis L.—Segr. *S. vulgaris* (Boenn.). 1. Oxwich. 2. Cockett. 3. Near Crumlin Bog. 5. Aberafan, Port Talbot Docks, Margam Moors. 7. Barry, *D.*! 8. Aberdare, Cwmaman. *S. sativa* (Boenn.). 1. Paviland, Horton. 2. Near Loughor. 5. Port Talbot, Mawdlam. 6. Newton and Nottage, *J. Bot.* 1902, p. 316. 8. Aberdare, in several spots.

Alsine rubra Crantz. 3. Tennants Canal, Swansea, *Hb. Cardiff.* Quarry near Greenhill Turnpike, *Gutch.* 5. Port Talbot. 6. Porthcawl. 8. Aberdare, Cardiff Docks, Taffs Well. Penarth, &c., *Storrie.*

A. media Cr. 2. Loughor, *Hb. Motley.* 3. Muddy shores near Neath Canal, *Gutch.* 6. Porthcawl. 7. St. Athan's Road to Llantwit Major. Barry, *Storrie.* 8. Penarth, &c., *Storrie.* 9. Pengam marshes. It is possible that all the above should go under the variety.—Var. *neglecta* Kindb. 1. Penclawdd, Gowerton, Worms Head. 2. Loughor marshes. 5. Port Talbot Docks, Aberafan. 6. Porthcawl. 7. Aberthaw. 8. Cardiff Docks. Grangetown.

A. marginata L. H. G. Reich. 1. Gowerton. Penclawdd, *E. F. L.* Llanmadoc (f. *glandulosa*). 2. Loughor marshes. 5. Port Talbot Docks, both forms. Margam Moors, f. *glandulosa.* 7. Aberthaw. St. Athan's Road, f. *glandulosa.* 8. Grangetown. 9. Pengam marshes.

**A. rupicola* Hiern. 1. Mewslade Bay, Worms Head, Burry Holm.

**Polycarpon tetraphyllum* L. 5. Sandy wastes between Pyle Inn and the sea, *B. G. Hb. Bicheno* contains a specimen from "S. Wales." Of course Dr. Turton (the authority for *B. G.*) made serious mistakes. But I do not believe that in the above situation any possibility of introduction exists. The likelihood of error is

much reduced, if not eliminated, by Bicheno's specimen. And I believe the record to be a good one. 8. Near Canton Common, *Storrie*. Probably introduced.

Portulaceæ.

Montia fontana L.—*α. repens* Pers. 1. Very frequent. 2. Gowerton Common, Mynydd Garn Goch, Pantyffynon to Pontardulais. 3. Ystalyfera. 4. Hirwaun to Glyn Neath, Neddfechan Glen. 8. Frequent about the Aberdare hills. 9. Caerphilly Common.—*β. erecta* Pers. 2. Llangyfelach. 4. Hirwaun to Pontneddfechan. 5. Shallow overflows of the Afan valley between Pontrhydyfen and Cymmer. 8. Rills and streams, Aberdare, Hirwaun, source of the Rhondda Fach, Ystradowen. 9. Caerphilly Common.

Hypericineæ.

Hypericum Androsæmum L. Frequent.

H. perforatum L. Probably general in dry warm spots, ascending to 1500 ft. at Craig-y-llyn.—Var. *angustifolium* Gaud. 1. Oxwich, Parkmill. 5. Near Mawdlam. 7. Barry Island.

H. maculatum Crantz. 1. Clyne Common, *W. M. R.* Oxwich, Parkmill and neighbourhood. 2. Upper Loughor River, below Pantyffynon. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Common near Swansea, *Ball.* 4. Glyn Neath, Neddfechan Glen. 6. Merthyr Mawr. 7. Sully, *Woods.* 8. Frequent in Cynon Valley, Peterston, Ystradowen. St. Fagan's, Llandaff, &c., *Storrie.* 9. Lane from Caerphilly to Cefn On, near Ruperra, Llanishen.—Var. *Babingtonii* Groves. 8. Aberdare.

H. quadrangulum L. Frequent, all districts.

H. humifusum L. All districts except 6, frequent in 1. 2. 8.

H. pulchrum L. 1. Heathy spots, frequent. 2. Penyrheol, Penllergaer, Pantyffynon to Pontardulais. 3. Singleton and Neath Canal, *Gutch.* Ystalyfera. 4. Frequent, ascending to Craig-y-llyn. 6. S. Cornely and the downs near. 7. Stalling Down, Ystradowen. Barry, *D.* Flat Holm, *J. Bot.* 1891, p. 345. 8 and 9. Frequent.

H. hirsutum L. 1. Parkmill. 3. Neighbourhood of Swansea, *Flower & Lees.* 6. Ewenny. Near Porthcawl, *Lloyd.* 7. Frequent. 8. Leckwith Woods. Cooper's Fields, *Storrie.*

**H. montanum* L. 1. Oxwich, Nicholaston Woods, Parkmill. 6. S. Cornely. 7. Cold Knap. Mostly close to the sea.

H. elodes L. 1. Downs and commons in plenty, Broughton Bay. 2. Frequent. 3. Crumlin Bog, *Lightf.* Singleton and Port Tennant, *Gutch.* 5. Mynydd Sylen, *Hb. Motley.* 8. Hirwaun, Aberdare, Welsh St. Donat's, Ystradowen. Pontypridd, *Storrie.* 9. Penylan, *Storrie.* Caerphilly Common.

Malvaceæ.

Althæa officinalis L. 1. Oxwich, Gowerton, Whitford sands, Llanmorlais to Llanrhidian. 2. Loughor marshes. 7. Aberthaw, Ddaw estuary near St. Athan's Road. Barry Island, *Woods.* Barry to the Leys, *D.*

Lavatera arborea L. 1. Native in Mewslade Bay and on cliffs adjoining. Paviland Cave, *Gutch*. Langland Bay, *W. M. R.* 6. Porthcawl sand-hills, *Hb. Motley*. 7. Flat Holm, *J. Bot.* 1891, p. 345. 8. Ballast or planted, Cardiff and Penarth.

Malva moschata L. 1. Cheriton to Llanrhidian, Reynoldstone to Paviland. Caswell Bay, *W. M. R.* 2. Pantyffynon. 3. Common near Swansea, *Gutch*. 5. Port Talbot to Pyle, Kenfig. 6. Porthcawl to S. Cornely. 7. Sully, Barry Island, Porthkerry, Llandough by Cowbridge, Cowbridge to St. Athan's Road. 8. St. Fagan's to Peterston, Ystradowen, Aberdare, Taffswell. Llandaff and Cardiff, *Storrie*. 9. Lisvane.—Var. *intermedia* Gren. & Godr. 4. Neath. 6. Near S. Cornely, Porthcawl to Merthyr Mawr. 7. St. Athan's Road, Llantwit Major, Cowbridge. 8. Aberdare, Ystradowen, Peterston Moor. 9. Llanishen.

M. sylvestris L. 1. Native on cliffs at Port Eynon. Generally distributed throughout the county.

M. rotundifolia L. Native: see *J. Bot.* 1905, p. 92. 1. Port Eynon, very small, forming part of the turf of the sand-hills. Paviland, *Swansea Sci. Soc. Proc.* 1892-3. Rhosili, and round the coast to Llanrhidian. 3. Singleton, *Gutch*. 5. Aberafan, *Hb. Motley*. Port Talbot Docks. 6. Near Nottage, Ogmore Castle. 7. Swanbridge. Barry, *D*. The Leys, Aberthin, Cowbridge, Llantwit Major. Flemingstone and St. Athan, *Storrie*. 8. Aberdare. Cardiff, *Cardiff Nat. Soc. Proc.* 1873.

Tiliaceæ.

(*Tilia platyphyllos* Scop. 6. Porthcawl, *Lloyd*. Not native, even if correct.)

T. cordata Mill. 1. Three Cliffs Bay, cliffs near Pwlldu Head. Wood between Gower Inn and Penrice, *Flower & Lees*. 3. Ystalyfera. 4. Woods of the Perddyn Gorge. Woods about Pontneddfechan, *B. G.* 5. Cwm Dyffryn, *Hb. Motley*. 7. Hedges at Barry. 8. Werfa Wood, Aberdare, apparently this species.

Lineæ.

Radiola linoides Roth. 1. Frequent. 5. Sandy hollows, Margam sands to Kenfig. 6. St. Bride's Major, *Storrie*. 8. Welsh St. Donat's. E. Moors, Cardiff, *Storrie*.

Linum catharticum L. A dwarf compact form grows on the cliffs of Gower. Records of type from all districts.

L. angustifolium Huds. 1. Port Eynon to Oxwich. 3. Frequent about Swansea, *B. G.* 5. Port Talbot Docks. 6. Porthcawl sands to S. Cornely. 7. Shore near Boverton, Cadoxton, Porthkerry. Swanbridge and Colhugh, *Storrie*.

Geraniaceæ.

Geranium sanguineum L. 1. Sands and limestone cliffs of the Gower coast, in plenty, from Pwlldu to Llanmadoc. 6. Dunraven, *Storrie*.

**G. pratense* L. 3. Near Swansea, *Moggridge*. 4. Glyn Neath and Pontneddfechan. Moorland W. of the Perddyn Glen, *Ley*.

5. Port Talbot to Pyle. 6. Dunraven Park, *Cardiff Nat. Soc. Proc.* 1873. 7. Merthyr Dyfan. Sully &c., *Storrie*. 8. Aberdare. Cardiff, *Storrie*.

G. pyrenaicum Burm. fil. 3. Between Swansea Ferry and the Race Course, *Flower & Lees*. Between Swansea and Crumlin, *N. B. G. Supp.* 6. S. Cornely, *Dillwyn*. 8. Penarth Ferry and E. Moors, *Storrie*.

G. molle L. All districts except 2. It is a favourite plant of the Burrows, where it often varies with nearly white flowers.

G. pusillum L. 1. Oxwich, Llangenydd. 3. Sketty Burrows. 4. Glyn Neath. 5. Port Talbot. 8. Aberdare. E. Moors, Cardiff, *Hb. Cardiff*. 9. Frequent Penylan, Roath, &c., *Storrie*.

G. rotundifolium L. 3. Swansea, *Flower*. 6. Pyle to Newton Nottage, *E. S. M.* 8. Cardiff Docks. Penarth Ferry, E. Moors, &c., *Storrie*.

G. dissectum L. Probably common, but with considerable gaps in distribution. No record for district 4.

G. columbinum L. 1. Llangenydd. Paviland, *Swansea Sci. Soc. Proc.* 1892–3. Langland and Caswell Bays, *W. M. R.* 3. Between Ferry and Port Tennant, *Gutch*. 6. Porthcawl to S. Cornely, Ewenny. 7. Fairly common. 8. Aberdare, Ystradowen. Cardiff, *J. Bot.* 1884, p. 257. 9. Llanishen, Lisvane.

G. lucidum L. 1. Common on the limestone. 3. Swansea. 4. Pontneddfechan, Rhigos. 6. Laleston, St. Bride's Major, Ewenny, Ogmore Castle and neighbourhood. Southerndown, *D*. Near Porthcawl, *Lloyd*. 7. Sully. St. Hilary, *Cardiff Nat. Soc. Proc.* 1882. 8. Aberdare, Morlais, Merthyr Tydfil. Penarth, St. Fagan's, &c., *Storrie*. Rhondda Valley, *Rhondda Fl.*

G. Robertianum L. Common and well distributed, rising to the Rhondda cliffs, 1500 ft.—Var. *purpureum* auct. angl. 1. Limestone cliffs, Pwlldu. Llanmorlais, *E. F. L.* 5. Port Talbot, *Hb. Motley*. 7. The Leys, Porthkerry.

Erodium cicutarium L'Hérit. As an aggregate, common on the sea coast: much less common inland. Records of the aggregate from districts 1 and 3 are plentiful. 5. Aberafan, Port Talbot. 6. Porthcawl. Sker, *J. Bot.* 1902, p. 249. 7. Barry Island, Fontigary, The Leys. 8. Llandaff, Penarth, &c., *Storrie*. Cardiff Docks.—Var. *chærophyllum* Cav. I believe that under this segregate come specimens from 1. Caswell Bay and Pwlldu Head, Penclawdd, Llanmadoc sands. 4. Crumlin Burrows. 5. Sands, Kenfig. Port Talbot. 7. Barry Island. 8. Cardiff.—Var. *triviale* Jord. 1. Penard sands, 1839, *Hb. Babington*. 5. Port Talbot.—Var. *glandulosum* Bosch. 1. Common on the burrows and sands of Gower, with the type. 3. "*Geranium cicutarium fl. albo* frequently upon the sea sands near Crumlin Bog," *Lightf.*, is probably this. 4. Briton Ferry Road Station, *Herb. Brit. Mus.*, specimen labelled *E. moschatum*. 5. Port Talbot. 6. Porthcawl sandhills, Merthyr Mawr sands. Sker, *J. Bot.* 1902, p. 249. 7. Barry Island.

**E. moschatum* L'Hérit. 1. Port Eynon and cliffs at Horton, native. 5. Port Talbot Docks. 8. Cardiff Docks.—Var. *minor* Rouy & F. 5. Apparently this var. at Port Talbot Docks.

E. maritimum L'Hérit. 1. Langland Bay to Llanmadoc, sands and cliffs. 3. Near Swansea, *Westcombe*. 5. Mawdlam. 6. Sker Point, *Hb. Motley*. Southerndown, *Cardiff Nat. Soc. Proc.* 1876. 7. Flat Holm in plenty, *Lightf.* Barry and St. Donat's, *Storrie*.

Oxalis Acetosella L. Generally distributed in shady spots; up to Craig-y-llyn. In all districts.

Ilicineæ.

Ilex Aquifolium L. Common.

Celastrineæ.

Euonymus europæus L. 1. Three Cliffs Bay, Oxwich Bay and Point, Llanmadoc. Langland Bay to Oystermouth, *W. M. R.* 3. Hedges Swansea, *Flower & Lees*. 4. Frequent about Neath, *Flower & Lees*. 6. Limestone at Ogmore Castle. Pencoed, *Storrie*. 7. Barry, *D !*. Cowbridge to Llandough, Wenvoe. 8. Taffs Well, Leckwith Woods. St. Fagan's and Tongwynlais, *Storrie*. 9. Cefn On. Penylan, *Storrie*.

Rhamneæ.

Rhamnus catharticus L. 1. Clyne and other woods, *Flower*. Penrice, *B. G.* Oxwich Bay, Llanmadoc. Langland Bay, *W. M. R.* 7. Flat Holm, *B. G.* St. Hilary, *Cardiff Nat. Soc. Proc.* 1882.

R. Frangula L. 1. Clyne Wood, *Flower*. 3. Crumlin Bog. 4. Gilfach, Neath. 5. Mynydd Emroch, *Hb. Motley*. 6. Near Porthcawl, *Lloyd*. 7. Flat Holm, *J. Bot.* 1891, p. 345. This list, however, does not give *R. catharticus* there. 8. Aberdare to Penrhiwceiber, frequent, Peterston Moor, Garth Wood, Llantrissant. Frequent, Whitchurch, Hensol, Pontypridd, &c., *Storrie*. 9. Llanisheu.

Sapindaceæ.

**Acer campestre* L. Frequent: but no records from 3 & 5.

Leguminosæ.

Genista anglica L. 1. Clyne Common, *W. M. R.* 2. Gowerton, Mynydd Garn Goch. Loughor, *Hb. Bicheno*. 4. Rhigos, *Woods*. Glyn Neath. 5. Bryn, *H. H. Whitehouse*. 7. Beaupré, *Cardiff Nat. Soc. Proc.* 1882. Llantwit Major, *Hb. Cardiff*. Lavernock, Barry, &c., *Storrie*. 8. Ystradowen Moor, Aberdare and neighbourhood, common; Quakers Yard, Mountain Ash.

G. tinctoria L. 2. Meadows, Penllergaer, *Gutch*. 3. Llandwr and Forest Marsh, *Gutch*. 4. Hirwaun Common, hills above Perddyn Gorge. 5. Pyle to Margam. 6. Bridgend, Monknash to Llandow, near Southerndown Road Station. 7. Near Monknash, common in eastern half of district. 8. Craig-yr-allt, *Hb. Cardiff*. Lavernock, Penywaun (Aberdare). Cardiff, *Cardiff Nat. Soc. Proc.* 1873. Penarth, &c., *Storrie*. 9. Roath.

Ulex europæus L. Common, but not ascending to the very high ground.

U. Gallii Planch. Well distributed and locally common. Records from all districts. It rises to the top of the hills at Aberdare, say 1600 ft.

(*U. minor* Roth. Mr. F. A. Lees, in *J. Bot.* 1879, p. 84, says that he found it in Glamorgan, in 1871 : but in 1904 he wrote to say that he now withdraws the record as uncertain. Specimen labelled *Ulex nanus* from Worms Head, 1844, in Hb. Motley, is, I believe, very stunted *U. Gallii*.)

Sarothamnus scoparius Wimm. Native; but also frequently planted. 1. Local in Gower and native, *e. g.* Langland and Caswell Bays and Clyne Common, *W. M. R.* Parkmill and Oxwich, Penclawdd. 2. Fairly common. 3. Ystalyfera. Near Pontwern and near Poppit Hill, *Gutch*. 4. Neath, hills above Aberpergwm. 5. Lower Afan Valley in many places. 6. Merthyr Mawr. Near Porthcawl, *Lloyd*. 7. Cwrtyrala, *Cardiff Nat. Soc. Proc.* 1867. Dinas Powys, *D.* 8 and 9. Common.

Ononis repens L. 1, 7, 8. Frequent. 2. Pontardulais, Gowerton. 3. Swansea. 4. Jersey Marine. Neath, *W. M. R.* 5. Aberafan. 6. Porthcawl to S. Cornely, Bridgend and eastward. 9. Pwllypant, *Storrie*. Lisvane, near Ruperra.—Var. *horrida* Lange. 4. Briton Ferry, *Hb. Brit. Mus.* 5. Sands at Aberafan. 6. Sands at Porthcawl. 7. The Leys.

O. spinosa L. 2. Fields near Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Neglected pastures in the neighbourhood of Swansea, *Flower & Lees*. 7. Barry, Sully, Swanbridge, Lavernock. 8. Penarth, Lavernock. Cogan, &c., *Storrie*.

**Trigonella ornithopodioides* DC. 1. Short turf of limestone cliffs at Rhosili. 8. Ballast, Cardiff, &c., *Storrie*, and Ynyshir, *Rhondda Fl.*

Medicago lupulina L. Common, but no records from high ground or from district 9.

**M. arabica* Huds. 1. Mumbles and Gower, *Lloyd*. 5. Port Talbot Docks. 6. Porthcawl sands, apparently native. 7. Barry, *Storrie*. 8. Taffs Well, Cardiff Docks. Penarth, &c., *Storrie*.

(*M. minima* L. 1. Oxwich Bay, *Flower & Lees*. Some doubt of this, *Top. Bot.* I have not rediscovered it. 7. Barry, *Storrie*. 8. E. Moors and Penarth, on ballast, *Hb. Cardiff*.)

Melilotus officinalis Lam. 1. Near Penclawdd. Langland Bay, *W. M. R.* 3. Swansea, *Flower & Lees*. 5. Port Talbot. 6. Near Porthcawl, *Lloyd*. 7. Barry, Barry Island. Ystradowen, *Cardiff Nat. Soc. Proc.* 1882. 8. Aberdare, rare. Penarth, E. Moors, &c., *Storrie*.

M. Petitpierreana Hayne. 2. Gowerton. 3. Swansea. 6. S. Cornely. 7. Sully, *Woods*. 8. About Aberdare, frequent. Ballast at Cardiff, *Storrie*.

Trifolium pratense L. Common. The var. *sativum* Schreb. occurs on ballast and waste ground in many places.

T. medium L. 1. Rhosili, Gowerton. 5. Mawdlam, Baglan. Frequent elsewhere; but no records for 6.

T. squamosum L. 8. Cardiff, docks and moors. 9. Pengam moors, in great quantity.

T. arvense L. 1. Oxwich to Port Eynon, cliffs. 3. Swansea. Sketty Burrows, *Flower & Lees*. Ystalyfera. 5. Aberafan and Port Talbot. Baglan, *R. G. Llewellyn*! 6. Porthcawl. Near Southerndown, *Storrie*. 8. Cardiff Docks. Hirwaun. Introduced

on railway ballast in Rhondda Valley, *Rhondda Fl.*—Var. *prostratum* Lange. 5. Aberafan.

**T. striatum* L. 1. Cliffs near Pwlldu, Oxwich to Port Eynon, Rhosili much. 5. Aberafan. 6. S. Cornely. Road from Pyle to Newton Nottage, *E. S. M.* 7. Swanbridge, Cold Knap and Porthkerry much. 8. Ballast plant at Cardiff, *Storrie*, and in the Rhondda Valley, *Rhondda Fl.*

T. scabrum L. 1. Frequent on coast. 3. Swansea and Sketty Burrows, *Flower*. 5. Aberafan. Cornely to Mawdlam, *E. S. M.* 6. Porthcawl much, S. Cornely, Southerndown to Ogmore Castle. 7. Swanbridge, Cold Knap, Porthkerry. 8. Ballast, Cardiff, *Storrie*. 9. Near Rumney Bridge, *Storrie*.

**T. glomeratum* L. 3. Swansea and Sketty Burrows, *Flower*. 8. Aberdare. Ballast, Cardiff, *Storrie*.

T. repens L. Common.

T. fragiferum L. 1. Rhosili, Llanmorlais to Llanrhidian. 3. Singleton and banks of Neath Canal, *Flower*. 5. Aberafan. Kenfig Pool, *Hb. Motley*. 6. Pwllcawl, *Hb. Motley*. 8. Cardiff, *Storrie*. 9. Pengam Moors near Rumney Bridge, *Hb. Cardiff*.

T. procumbens L. and *T. dubium* Sibth. Common.

**T. filiforme* L. 1. Fairwood Common. Penmaen, *A. Ley*. Rhosili, very common; Parkmill, Oxwich, Reynoldstone to Paviland. 3. Near Swansea, *J. Bot*. 1886, p. 112. 5. Lawns at Margam and Baglan. 6. S. Cornely. 7. Lawns at Cowbridge and Wenvoe; Porthkerry. 8. Blaennant, at 1000 feet; Lawn, Aberdare. Penarth, Llandaff, &c., *Storrie*. 9. Caerphilly and Castle, and hills close by.

Anthyllis Vulneraria L. 1. Frequent. 2. Gowerton. 3. Marsh near Singleton and Kilvey Hill, *Gutch*. 5. Port Talbot to Pyle. 6. Porthcawl to S. Cornely. 7. Frequent. 8. Aberdare, Taffs Well, Ystradowen. Bodringallt, Tylacoch, Blaenycwm, &c., *Rhondda Fl.* Ballast, Cardiff and Penarth, *Storrie*. 9. Craig Llanishen. Pwllypant, *Storrie*.—Var. *ovata* Bab. 1. Rhosili.—Var. *coccinea* L. 1. Rhosili, Mewslade Bay. Langland Bay and Newton Cliffs, *W. M. R.* 3. Swansea, *Dillwyn*. 6. Porthcawl to Sker. 8. Near Cardiff, *Hb. Brit. Mus.*

Lotus corniculatus L. Common.—Var. *crassifolius* Pers. 1. Penard, Oxwich, Mewslade Bay to Rhosili. 5. Margam. 7. The Leys.—Var. *villosus* Ser. 1. Gower Coast. 5. Aberafan Burrows. 8. Aberdare.

**L. tenuis* Waldst. & Kit. 8. Cardiff marshes.

L. uliginosus Schkuhr. Frequent in both glabrous and hairy forms.

(*L. angustissimus* L. 6. Porthcawl, *Lloyd*. Evidence insufficient.)

Ornithopus perpusillus L. 3. Near Swansea, *Swansea Sci. Soc. Proc.* 1891–2. 5. Baglan, *R. G. Llewellyn*! Aberafan, *Whitehouse*. 7. Sully, Barry, *Storrie*. 8. Ballast about Cardiff, *Storrie*.

**Astragalus glycyphyllos* L. 7. Cold Knap! 8. Penarth, extinct, *Storrie*.

Hippocrepis comosa L. 1. Limestone cliffs near Penard.

**Onobrychis viciæfolia* Scop. 7. Sully, looking native. Nash Point. Coast by Llantwit Major, probably native. Boverton, *Hb. Cardiff.* Barry, *D.*! Fontigary. 8. St. Fagan's, *Storrie.*

Vicia hirsuta S. F. Gray. 3. Fabians Bay, *Gutch.* Cultivated ground near Swansea, *Flower & Lees.* 4. Resolven. 5. Baglan, Port Talbot. 6. Near Porthcawl, *Lloyd.* 7. Cadoxton, Barry, Cowbridge. 8. Aberdare, Taffs Well. Hirwaun, *B. A. Williams.* Blaenrhondda, Bodringallt, &c., *Rhondda Fl.* 9. Llanishen.

V. tetrasperma Moench. 3. Swansea, *Flower & Lees.* 6. Newton. 8. Frequent, Cardiff, Penarth, St. Fagan's, &c., *Storrie.* Railway side near Blaenycwm Tunnel, *Rhondda Fl.* 9. Llanishen, Rudry.

V. Cracca L. Common.—Var. *incana* Thuill. 7. Nash Point.

V. Orobus DC. 2. Penllergaer, &c., *Gutch.* 4. Glyn Neath to Hirwaun. Vernon Park, *Nicholson.* 8. Cwm Selsig, Rhondda Valley. Aberdare, frequent.

V. sylvatica L. 3. Near Swansea, *Moggridge.* 6. Bridgend to Penyfae. 7. Llanbleiddian, Penllin, *W. F. Evans.* Near Cadoxton, *Storrie.* 8. Near Cardiff, *Cardiff Nat. Soc. Proc.* 1873. Caerau, St. Fagan's, &c., *Storrie.* Llanharry. Penrhys Brook, Bodringallt Woods, &c., *Rhondda Fl.* Penarth, *Wats. MSS.*

V. sepium L. 1, 4, 7, 8. Common. 2. Cockett, Penyrheol. 3. Crumlin Bog, &c. 5. Pyle, Port Talbot. Graigafan, *Hb. Motley.* 6. Bridgend, Porthcawl to S. Cornely, Ewenny. 9. Llanedan, Ruperra, Caerphilly and Craig Llanishen.

V. angustifolia L. Common plant of the coast sands. 1. Frequent. 2. Gowerton, Penyrheol, Loughor. 3. Ystalyfera. Swansea, *Gutch.* 4. Neath. 5. Sands, frequent. Foel-y-Mynyddau, *Hb. Motley.* 7 and 8. Frequent. 9. Rumney, Pengam, *Storrie.*—Var. *Bobartii* Koch. 8. Aberdare. 9. Llanishen.

V. lathyroides L. 1. Near Penard Castle, *Hb. Wats.* 3. Swansea, *Gutch*; but a doubtful record, *Phyt.* i. 380. 6. Porthcawl, *J. Bot.* 1902, p. 316. 8. Frequent, Grangetown, Penarth, *Storrie.* 8. Roath, *Storrie.*

V. bithynica L. 8. Wood near Cardiff, *Hb. Brit. Mus.*

**Lathyrus Nissolia* L. 7. Lavernock, cliffs, *Hb. Cardiff.* Swanbridge, Barry, &c., *Storrie.*

L. pratensis L. Common.

L. sylvestris L. 1. Langland Bay, *Hb. Cardiff.* Caswell Bay, *Hb. Brit. Mus.* Oystermouth Castle, *Flower.* Oxwich Wood, &c., *Dillwyn.* 6. Merthyr Mawr, Bridgend. 7. Swanbridge, Porthkerry, Dinas Powys. Sully, *Hb. Cardiff.* Wenvoe, *D.*! Cowbridge to Bridgend, *W. F. Evans.* 8. Lavernock to Penarth, on cliffs, plenty. St. Fagan's, *Storrie.* Caerau, *Hb Cardiff.*

L. palustris L. 1. Llanrhidian, *J. Bot.* 1891, p. 251.

L. montanus Bernh. 1. Rhosili. Clyne Wood, *Gutch.* 2. Loughor, Penllergaer, *Gutch.* 4. Craig-y-llyn, hills from Aberpergwm to R. Perddyn. 8. Aberdare, frequent, cliffs of the Rhondda Valley. Blaenrhondda, *Rhondda Fl.* 9. Penylan, Wedal, Llanishen, Pwllypant, &c., *Storrie.* — Var. *tenuifolius* Reichb. fil. 8. Aberdare, frequent.

Rosaceæ.

Prunus spinosa L. 1, 2, 4, 6, 7, 8, 9. Frequent. 3. Ystalyfera. 5. Port Talbot.

**P. insititia* Huds. 1. Llangenydd. 2. Pantyffynon. 4. Rhigos. 5. Baglan. 6. Bridgend, Marcross to Llandow. 7. St. Donat's to Nash Point, Cowbridge, Wenvoe, Cadoxton. Frequent, *Storrie*.

(*P. avium* L. 7. Near Porthkerry, *D.*! Cwm George, *Storrie*. 8. Near Aberdare. Llandaff, Penarth, Coedriglan, &c., *Storrie*. Status doubtful.)

**P. Cerasus* L. 1. Llangenydd. 2. Penllergaer. 7. Wenvoe. 8. Taffs Well, *Storrie*.

P. Padus L. 2. Penllergaer, Loughor. 3. Near Swansea, *Moggridge*. 4. Pontneddfechan, common, Glyn Neath, Neddfechan Glen. 7. Barry, St. Hilary, Gigman Bridge, &c., *Storrie*. 8. Merthyr Tydfil, Aberdare. Glyn Cymmer, *Rhondda Fl.*

Spiræa Ulmaria L. 1, 2, 4, 6, 7, 8, 9. Frequent. 3. Crumlin Bog. No record for 5.—Var. *denudata* Boenn. 1. Parkmill, Llanrhidian, Port Eynon. 4. Glyn Neath, Neddfechan Glen. 5. Port Talbot. 6. Bridgend. 8. Peterston, Pontsarn, Aberdare, Penrhiwceiber, Taffs Well. 9. Caerphilly, Llanishen.

(*S. Filipendula* L. 8. Penarth, Heolymynydd, near Ham, *Storrie*. I have seen no specimen.)

Rubus. In addition to the records made in *Journ. Bot.* 1906, p. 90, the following have been noted :—

R. idæus L. 2. Penllergaer. 4. Perddyn Gorge, Melincourt Glen, Resolven. 8. Ynyshir, Bodringallt, Midrhondda, Blaenrhondda, *Rhondda Fl.*

**R. nitidus* Weihe & Nees subsp. *opacus* Focke. 2. Mynydd Garngoch, a plant which only differs from good *opacus* in having the basal leaflets sessile or nearly so.

R. cariensis Génév. 1. Llanrhidian, Gowerton, Fairwood Common, Parkmill, Reynoldstone to Paviland, Horton. 2. Common. 3. Sketty, Ystalyfera. 4. Melincourt Glen.

R. incurvatus Bab. 3. Ystalyfera.

R. Lindleianus Lees. 1. Gowerton. 3. Ystalyfera. 4. Pontwhalby. 6. Monknash.

R. argenteus Weihe & Nees. 1. Gowerton, Parkmill. 2. Very common. 3. Crumlin Burrows and hills near, Ystalyfera. 4. Pontwhalby, Rhigos Hill, near Jersey Marine.

R. rhamnifolius Weihe & Nees. 1. Gowerton. Killay to Penard, *G. C. D.* 2. Gowerton, Mynydd Garngoch, Penllergaer. 6. Monknash.—Subsp. *Bakeri* F. A. Lees f. *elongata*. 4. Rhigos.

R. nemoralis P. J. Muell. var. *Silurum* A. Ley. 2. Gowerton Common, plenty on Mynydd Garngoch, Penllergaer. 3. Ystalyfera.

R. pulcherrimus Neum. 3. Ystalyfera.

R. villicaulis Koehl. subsp. *Selmeri* (Lindeb.). 2. Mynydd Garngoch, a small form, in plenty. 4. Rhigos Hill.

R. gratus Focke. 3. Ystalyfera.

R. Godroni Lec. & Lam. 4. Rhigos, a form going off to var. *robustus*. 8. Hirwaun, a form with exceptionally hairy stem.—Var.

foliolatus Rogers & Ley. 3. Ystalyfera, Crumlin Bog and the surrounding hills. — Var. *robustus* (P. J. Muell.). 1. Clyne Common, a form with very round leaflets. 4. Pontwhalby, Rhigos Hill.

R. rusticanus Merc. 1. Gowerton, Cefn Bryn, Reynoldstone to Paviland. 2. Common. 3. Sketty, Town Hill, Swansea, Crumlin Burrows, Ystalyfera. 5. Hills behind Port Talbot. 6. Monknash. 7. Dinas Powys to Sully Island, Cadoxton, Wenvoe, Fontigary, Lavernock. 8. Leckwith, Penarth.

R. pubescens Weihe. 4. Pontwhalby, form.

R. macrophyllus Weihe & Nees var. **amplificatus* (Lees). 4. Rhigos.

R. hirtifolius Muell. & Wirtg. var. **danicus* Focke. 2. Penyrheol, Gorseinon. — Var. *mollissimus* Rogers. 2. Pantyffynon, f. *umbrosa*. Near Gorseinon, Mynydd Garngoch. Loughor, form.

R. iricus Rogers. 2. Loughor River, several places between Pantyffynon and Pontardulais, differing from the Irish plant in the "long petioluled and somewhat cuspidate-acuminate term. lt., and in the strongly ascending panicle branches," *W. M. R.*

R. pyramidalis Kalt. 1. Reynoldstone to Paviland, Port Eynon, Horton, moor near Burry Green. 2. Pantyffynon to Pontardulais. 3. Sketty.

R. leucostachys Schleich. 1. Killay to Penard, *G. C. D.* 2. Common. 3. Ystalyfera. 4. Pontwhalby, Rhigos Hill. — Var. *leucanthemus* P. J. Muell.? 3. Ystalyfera.

R. lasioclados Focke var. *angustifolius* Rogers. 2. Pantyffynon, Mynydd Garngoch. — Var. *longus* Rogers & Ley. 2. Gowerton, Mynydd Garngoch. 3. Ystalyfera. 4. Rhigos Hill.

**R. adenanthus* Boul. & Gill. 8. Aberdare, a plant which resembles the Gorey Bay plant more closely than the Cheshire plant does, *W. M. R.* First record for Wales.

R. cinerosus Rogers. 2. Pontardulais, not typical.

**R. Gelertii* Frider. 4. Pontwhalby, possibly this. 8. Aberdare, "though usually the panicle rachis is less densely prickly and hairy," *W. M. R.*

R. anglosaxonicus Gelert subsp.**curvidens* A. Ley. 2. Penllergaer, with panicle rather untypical. Loughor Valley near Pantyffynon and Pontardulais. 4. Pontwhalby. 8. Aberdare, not quite type.— Subsp. *vestitiformis* Rogers. 3. Ystalyfera.

R. melanoxylon Muell. & Wirtg. 4. Pontwhalby, nearer type than other Glamorgan plants, *W. M. R.* 8. Aberdare.

R. infestus Weihe. 3. Ystalyfera.

R. Borreri Bell Salt. 6. Monknash, nearly type.

R. Drejeri G. Jensen subsp. *Leyanus* Rogers. 1. Gowerton. 2. Common. 3. Ystalyfera. 4. Pontwhalby, Rhigos Hill, Melincourt Glen. 6. Merthyr Mawr.

R. ericetorum Lefv. var. *cuneatus* Rogers & Ley. 2. Penllergaer. 3. Above Sketty. 4. Pontwhalby, Rhigos Hill.

R. fuscus Weihe & Nees. 3. Ystalyfera.—Var. **nutans* Rogers. 8. Penywaun near Aberdare. First record for Wales.

R. rosaceus Weihe & Nees var. *hystrix* Weihe & Nees. 3. Ystaly-

fera. — Var. *infecundus* Rogers. 2. Pantyffynon, Penllergaer. 4. Pontwhalby.

R. Koehleri Weihe & Nees subsp. *dasyphyllus* Rogers. 2. Pontardulais, Gowerton. 3. Ystalyfera.

**R. serpens* Weihe. 4. Stony hillside, Glyn Neath, 1897, *A. Ley.*

R. horridicaulis (P. J. Muell.) Rogers & Ley. 4. Pontwhalby, Rhigos Hill.

**R. tereticaulis* P. J. Muell. 8. Fedwhir near Aberdare.

R. dumetorum Weihe & Nees var. *diversifolius* (Lindl.). 2. R. Loughor in some quantity Pontardulais to Pantyffynon. — Var. *raduliformis* A. Ley. 1. Llanrhidian.

R. corylifolius Sm. 1. Parkmill, Reynoldstone to Paviland. 2. Gowerton. 4. Pontwhalby, Resolven, Melincourt Glen.

R. cæsius L. 1. Reynoldstone to Paviland. 2. Common. 3. Ystalyfera. 4. Resolven, Melincourt Glen. 5. Hills behind Port Talbot. 6. Ewenny, Monknash. 8. Llandaff.

R. saxatilis L. 4. Perddyn Gorge.

Geum urbanum L. 1. Frequent. 2. Pantyffynon to Pontardulais, Gowerton Common, Penllergaer. 3. Ystalyfera. 4. Pontneddfechan, Glyn Neath, Resolven. 6. Merthyr Mawr, Bridgend, Ogmore Down, Ewenny. Near Porthcawl, *Lloyd.* 7, 8, 9. Frequent.

G. rivale L. 3. Ynyspenllwch Bridge, Ynysgerwn, *Dillwyn.* 4. Craigyllyn, 1500 ft. Perddyn Valley, Neddfechan Glen. Glyn Neath, *D.*! 7. Cwm George, *Storrie.* 8. Side of R. Cynon below Hirwaun, Merthyr to Morlais Castle, Pontsarn. Pontypridd, *Storrie.* Blaenycwm, Penrhys Brook, &c., *Rhondda Fl.* 9. Near Ruperra, Llanishen.

Fragaria vesca L. 1, 3, 4, 7, 8, 9. Frequent. 2. Pantyffynon to Pontardulais, Penllergaer. 6. S. Cornely, Ewenny, and the Down.

Potentilla sterilis Garcke. Common.

P. verna L. 1. Caswell Bay. Cliffs between Port Eynon and Worms Head, *B. G.*

P. erecta Dalla Torre. 1, 2, 4, 8, 9. Common. 3. Swansea, common, *Gutch.* Ystalyfera. 5. Cwmafan, *Hb. Motley.* 6. Porthcawl to S. Cornely. 7. Cadoxton, Wenvoe, Stalling Down. Ystradowen, *W. M. R.*

P. procumbens Sibth. Well distributed, though not common.— × *reptans* (= *P. mixta* Nolte). 7. Welsh St. Donat's. 8. Caerphilly.— × *erecta* (= *P. suberecta* Zimm.). 8. Welsh St. Donat's, Ystradowen.

P. reptans L. Common. — × *erecta* (= *P. italica* Lehm.). 9. Caerphilly, Craig Llanishen.

P. Anserina L. Common; the var. *sericea* Koch being rather commoner than the type, I believe.

Comarum palustre L. 1. Fairwood Common, Killay. 2. Penllergaer, Mynydd Garngoch. 3. Crumlin Bog. Singleton Marsh, *Gutch.* Bryn Mill, *Hb. Swansea.* 4. Llynfach. 6. Near Porthcawl, *Lloyd.* 7. Barry, Cowbridge, &c., *Storrie.* 8. Cardiff, *Cardiff Nat. Soc. Proc.* 1882. Hirwaun, Peterston, Welsh St. Donat's,

Ystradowen Moor, Llantrissant. 9. Caerphilly Castle, *Hb. Bicheno.* Llanishen, *D.*!

Alchemilla arvensis Scop. 1. Common. 3. Swansea, *Gutch.* 4. Wall at Glyn Neath. Neath, *W. M. R.* 5. Frequent on the sands. Graigafan, *Hb. Motley.* 6. S. Cornely, Ogmore Down, Ewenny. 7. Frequent in east half. 8. Aberdare, Morlais Castle, Garth Wood. Cardiff, Ely, St. Fagan's, *Storrie.* 9. Caerphilly, Craig Llanishen.

A. vulgaris L. Aggregate: 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Swansea, *Gutch.* 8. Cardiff, *Storrie.* Ystradowen. 9. Rhymney.—Segregates: a. *pratensis* (Schmidt). 4. Glyn Neath, R. Perddyn. 6. Ewenny. 7. Cold Knap. 8. Aberdare, Merthyr and Pontsarn, Peterston; Forest Wood, Ystradowen. 9. Frequent.—b. *alpestris* (Schmidt). 4. Glyn Neath, Rhigos Hill, Perddyn Gorge. 7. Porthkerry Park, *D.*! 8. Aberdare, frequent, Pontsarn, &c., Hirwaun.—c. *filicaulis* (Buser). 4. Glyn Neath. 6. Nottage, *J. Bot.* 1902, p. 316. 8. Pontsarn.

Agrimonia Eupatoria L. 1. Frequent. 3. Swansea, *Gutch.* Ystalyfera. 4. Neath, *W. M. R.* 5. Margam Moors, Port Talbot. 6. Porthcawl to S. Cornely, Bridgend, Ewenny. 7. Frequent. 8. Hirwaun, Ystradowen, Lavernock, Penarth, Grangetown. Cogan, Leckwith, *Storrie.* 9. Craig Llanishen, Ruperra.

A. odorata Mill. 1. Oxwich Bay. Bishopston, *Hb. Watson.* 2. Penllergaer. 4. Perddyn Glen, *A. Ley.*

Poterium Sanguisorba L. Frequent on the limestone and sands, and old red sandstone in 1, 6, 7, 8. Also 3. Sketty. 5. Kenfig Sands. 8. Welsh St. Donat's, Grangetown. Penrhys, Ffaldau, Ferndale, &c., *Rhondda Fl.*

Sanguisorba officinalis L. 2. Pontardulais to Pantyffynon. 3. Llansamlet and other places near Swansea. 4. Hirwaun to Neath, Craigyllyn. 8. Meadows and wet cliffs of Aberdare and Rhondda Valleys. 9. Caerphilly Common. Pwllypant, *Storrie.*

Rosa spinosissima L. 1. Clyne Common, *W. M. R.* Rhosili Down, and the sands and cliffs from Oxwich to Llanmadoc. 3. The burrows. 5. Margam sandhills. 6. S. Cornely, Ewenny Down, Porthcawl sands. Southerndown, *Storrie.* 7. Barry Island, Marcross, Nash Point. Fontigary, *Storrie.*

(*R. villosa* L. 4. Vale of Neath, *Flower & Lees.*)

R. tomentosa Sm. 1. Llanmadoc. 2. Pantyffynon to Pontardulais. 3. Not uncommon, *Dillwyn.* 4. Neddfechan Glen. Vale of Neath, *Flower & Lees.* 6. Bridgend, *Gutch.* Near Porthcawl, *Lloyd.* 8. Aberdare Valley, *sæpe.* Caerphilly to Taffs Well. 9. Caerphilly. Penylan Lane, *Storrie.*—Var. *subglobosa* (Sm.). 8. Aberdare.—Var. *scabriuscula* (Sm.). 8. Aberdare.

**R. eglanteria* L. 1. Llanmadoc. 3. In the Swansea list, *Swansea Sci. Soc. Proc.* 1891–2. 6. Llangynwyd, *Storrie.* 7. Flat Holme, *J. Bot.* 1891, p. 345. 8. Near Aberdare, *Storrie.* 9. Lisvane, *Storrie.*

**R. micrantha* Sm. 4. Neddfechan Glen. 7. Bonvilstone, *Storrie.* 8. Taffs Well. Whitchurch; Greenmeadow, *Storrie.*

**R. obtusifolia* Desv. 4. Glyn Neath. 5. Shore at Port Talbot. 8. Llwydcoed.

R. canina L. The aggregate very common.—a. *lutetiana* (Leman). 1. Langland Bay, *W. M. R.* Port Eynon to Oxwich, Parkmill, &c. 2. Gowerton. 3. Ystalyfera. Swansea, *J. Bot.* 1890, p. 157. 5. Port Talbot. 6. Ewenny Down. 8. Aberdare Valley, Peterston. — f. *andegavensis* (Bast.). 8. Aberdare. — b. *surculosa* (Woods). 1. Frequent, *Dillwyn*. Banks of the Penclawdd Canal. 2. Penllergaer, *Dillwyn*. 6. Bridgend, *Gutch*. 7. Llantwit, *Storrie*. 8. Taffs Well. — c. *sphærica* (Gren.). 8. Llwydcoed to Hirwaun.— e. *dumalis* (Bechst.). Probably the most frequent form. 1. Three Cliffs Bay, Quoity Green, Llanmadoc. Langland Bay, *W. M. R.* Killay to Parkmill, *G. C. D.* 3. Near Swansea, *J. Bot.* 1890, p. 157. 5. Port Talbot. 6. Near Nottage, Bridgend. 7. Cowbridge, Aberthaw. 8. Aberdare, Peterston, Taffs Well, Hirwaun. 9. Caerphilly, Ruperra, Craig Llanishen.—i. *urbica* (Leman). 3. Near Swansea, *J. Bot.* 1890, p. 157. 4. Neddfechan Glen. 7. Barry, Cowbridge. 8. Aberdare, Peterston, Taffs Well.—j. *dumetorum* (Thuill). 3. Near Swansea, *J. Bot.* 1890, p. 157. 8. Aberdare.

**R. glauca* Vill. var. *subcristata* Baker. 1. Oxwich Bay. 6. S. Cornely.

R. stylosa Desv. var. *systyla* (Bast.). 1. Three Cliffs Bay. Near Gower Inn, *Hb. Motley*. Penard to Penrice, *Flower & Lees*. Caswell Bay to Langland Bay, *W. M. R.* 6. Nottage, Bridgend, S. Cornely, Merthyr Mawr. 7. Aberthaw, Nash Point, Porthkerry, near Llantwit Major. 8. Leckwith Hill, near Ystradowen, Peterston, Lavernock. 9. Penylan, *Storrie*.

R. arvensis Huds. Frequent. — Var. *orata* (Desv.). 7. Llanbleiddian. — Var. *bibracteata* (Bast.). 1. Pengwern Common. 9. Llanishen, Cefn On, Ruperra.

Pyrus torminalis Ehrh. 1. Penrice, *B. G.* 4. Neath Valley, *B. G.* Briton Ferry, *Gutch*. 5. Margam, *Hb. Motley*. 7. Wenvoe, *Cardiff Nat. Soc. Proc.* 1873. 8. Planted, *Storrie*.

P. Aria Ehrh. 4. Neath Valley, *B. G.* 8. Merthyr Tydfil, *B. G.* — Var. *rupicola* Syme. 1. Pwlldu Head, Oxwich Bay. 4. Craig-y-llyn, Ysgwd Eynon Gam. 8. Daren Bwllfa, Padell-y-bwlch, Graig Fawr Treorchy.

P. Aucuparia Ehrh. Common in the uplands, and recorded for all districts.

**P. communis* L. 7. Barry, Porthkerry, &c., *Storrie*. 8. Aberdare, and also f. *spinosa*. Leckwith, *Storrie*.

P. Malus L. var. *mitis* Wallr. As a frequent escape. —Var. *acerba* DC. 1. Hedges in Gower. Langland Bay, *W. M. R.* 2. Loughor, Penllergaer. 3. Ystalyfera. 4. Neath, Glyn Neath, Perddyn Gorge, Craig-y-llyn. 6. S. Cornely, Ewenny. 7. Cowbridge, Llandough, Aberthaw, Wenvoe, Porthkerry. 8. Pontsarn, Merthyr, Aberdare, Taffs Well. 9. Cefn On, Lisvane.

Cratægus Oxyacantha L. Common.

Saxifrageæ.

(*Saxifraga aizoides* L. 6. Maesteg, *Hb. Motley*. Perhaps should be confirmed before being definitely admitted.)

S. tridactylites L. 1. Common. 3. Swansea, *Flower & Lees.* 4. Jersey Marine, on sand, Pontneddfechan. 5. Sands. 6. On the limestone, frequent. 7. Aberthin. Llantrithyd, *Cardiff Nat. Soc. Proc.* 1882. 8. Llandaff, *Hb. Cardiff.* Limestone near Merthyr, plenty. 9. Roath, *Storrie.*

**S. granulata* L. 8. Copse near Aberdare, Pontsarn. Below Pontypridd, *Storrie.*

S. hypnoides L. 4. Craig-y-llyn. Near the Dinas Rock, *N. F. Sheppard.* 6. Glyn Corrwg, *N. B. G.* 8. Morlais Castle, and down nearly to the river, Padell-y-bwlch near Hirwaun, Graig Fawr Treorchy.

Chrysosplenium oppositifolium L. 1, 4, 8. Common. 2. Pontardulais to Pantyffynon. 3. Swansea, *Flower & Lees.* Ystalyfera. 5. Margam. Graigafan, *Hb. Motley.* 7. Stalling Down. 9. Caerphilly.

C. alternifolium L. 4. R. Perddyn, *N. F. Sheppard.* 8. M. Tydfil, *Hb. Watson.* 9. Llanishen, Heolymynydd, *Storrie.*

(*Parnassia palustris* L. 8. Bog near hospital, Rhondda Valley, *Rhondda Fl.* 9. Llanishen, Pwllypant, *Storrie.* Confirmation desired.)

(*Ribes alpinum* L. 7. St. Donat's, *Storrie.* 9. Caerphilly Castle, *Storrie.* Gutch's record is from Caermarthenshire.)

**R. rubrum* L. 1. Mumbles and Gower, *Lloyd.* 6. Porthcawl, *Lloyd.* 8. Garth Wood, native. Aberdare, Ystradowen. Outcast elsewhere.

**R. nigrum* L. 1. Oxwich, Parkmill. 2. River gravel above Pontardulais. 6. Porthcawl, *Lloyd.* 7. Wood at Wenvoe. By R. Ddaw, *Storrie.* 8. Aberdare. Llantwit Fardre, *D.*! Blaenrhondda, *Rhondda Fl.* 9. Caerphilly.

Crassulaceæ.

Cotyledon Umbilicus-Veneris L. Common.

**Sedum roseum* Scop. 4. Craig-y-llyn.

S. purpureum Tausch. 1. Frequent on the Gower coast. 3. Llandwr Marsh, *Gutch.* 7. Cowbridge, Llantwit Major, *Storrie.* 8. Aberdare (escape). Padell-y-bwlch, Hirwaun. 9. Llanishen, *Storrie.*

(*S. villosum* L. 6. Glyn Corrwg, *Storrie.*)

S. anglicum Huds. 1. Penard, *G. C. D.* 5. Aberafan Mountain, *Hb. Motley.* 7. Sully, Barry, Porthkerry, Fontigary, &c., *Storrie.* Fonmon, *D.*!

S. acre L. Very common.

**S. sexangulare* L. 5. Source of R. Afan, *Hb. Motley.* Apparently native.

**S. Forsterianum* Sm. 3. Banks of Neath Canal, *Gutch.* 7. Llandough, *Cardiff Nat. Soc. Proc.* 1882.—Var. *virescens* Lon. Cat. 4. Craig-y-llyn.

Droseraceæ.

Drosera rotundifolia L. 1. On the moors and commons, frequent. 2. Gowerton Common. Near Penllergaer, *Swansea Sci. Soc. Proc.* 1895-6. 3. Frequent, *Flower.* 4. Llynfach. 5. Cwm Bychan,

Hb. Motley. 8. Scarce on the hills near Aberdare, Welsh St. Donat's, Ystradowen. Cwmparc. Llanharry, *Cardiff Nat. Soc. Proc.* 1882. Mardy, Pontygwaith, *Rhondda Fl.* 9. Caerphilly Common. Llanishen, *Storrie*.

D. anglica Huds. 3. Crumlin Bog, *Hb. Brit. Mus.* Townhill, *Gutch*.

D. intermedia Hayne. 1. Rhosili Down, Cefn Bryn. Clyne Common, *Swansea Sci. Soc. Proc.* 1894–5. 2. Gowerton Common. 3. Crumlin Bog, *B. G.* 5. Cwm Bychan, *Gutch*. 6. Llangynwyd, *Storrie*. 8. Welsh St. Donat's, Ystradowen. Blaenycwm, *Rhondda Fl.*

Haloragieæ.

Hippuris vulgaris L. 1. Llangenydd, Oxwich. 3. Crumlin Bog and Tennant's Canal. 5. Port Talbot, Margam marshes. 6. Merthyr Mawr. 7. Barry, *D.*! 8. Leckwith, *Storrie*. Hirwaun, *B. A. Williams*. 9. Penylan, *Storrie*.

(*Myriophyllum verticillatum* L. 3. Crumlin Bog, *Swansea Sci. Soc. Proc.* 1891–2. 8. Leckwith, E. Moors, *Storrie*.)

M. spicatum L. 1. Oxwich, Cefn Bryn, Whiteford Point, Reynoldstone to Paviland. Fairwood Common, *G. C. D.* 2. Penllergaer, and R. Loughor above Pontardulais. 3. Crumlin Bog. 4. Resolven. 5. Port Talbot, Kenfig Pool. 7. Cadoxton. R. Ddaw, *Storrie*. 8. Aberdare, Peterston, Welsh St. Donat's, Ystradowen. Leckwith, *Storrie*.

**M. alterniflorum* DC. 1. Pitton. 4. Llynfach. 8. Aberdare, Merthyr Tydfil, Welsh St. Donat's. St. Ffagan's, *Hb. Dillenius*.

(*Callitriche palustris* L. (*C. verna* L.). 3. Swansea, *Gutch*. 8. E. Glamorgan, *Storrie*. Needs confirmation.)

**C. stagnalis* Scop. 1, 2. Common. 3. Crumlin Bog, Ystalyfera. 4. Neath Abbey, *W. M. R.* Neddfechan Glen, Melincourt Glen. 7. Llanbleiddian, Cadoxton, Barry to Bonvilstone. 8. Aberdare, Hirwaun, Grangetown. 9. Caerphilly, Llanishen.—Var. *serpyllifolia* Lönnr. 1. Pitton, Llangenydd, Oxwich. 8. Peterston.

C. intermedia Hoffm. (*C. hamulata* Kuetz.). 1. Frequent. 3. Crumlin Bog. 4. Llynfach. 5. Port Talbot Docks. 8. Aberdare to Hirwaun. 9. Caerphilly. — Var. *pedunculata* DC. 1. Pitton. 3. Swansea, *J. Bot.* 1886, p. 112. 5. Port Talbot, *Hb. Brit. Mus.* 8. Aberdare, Ystradowen.

C. obtusangula Le Gall. 3. Crumlin Bog. 5. Stream between Pyle and Port Talbot, *Hb. Brit. Mus.* Margam Moors. 7. Llandough and Cowbridge.

(*C. autumnalis* L. 3. Gwernllwynwith, *Gutch*. 4. Near Neath, *Gutch*. 7. Cadoxton Moors, *Storrie*. 8. Leckwith. *Storrie*.)

Lythrarieæ.

Peplis Portula L. 1. Frequent on the downs; Penard Burrows. 2. Mynydd Garngoch. Loughor Down and Groes Eynon, *Hb. Motley*. 3. Crumlin Burrows. Llandwr Marsh, *Gutch*. 4. Neath, *W. M. R.* Hirwaun Common, *B. A. Williams*. 5. Port Talbot. 8. Welsh St. Donat's, Ystradowen. Cefn On, Pontypridd, *Storrie*.

Lythrum Salicaria L. Well distributed, but not common.

Onagrarieæ.

Epilobium angustifolium L. 1. Fairwood Common. 2. Gowerton. 4. Cliffs of Craig-y-llyn, Glyn Neath, Hirwaun. Neath, *W. M. R.* 5. Aberafan. 6. Porthcawl, *Lloyd.* 7. Nash Point, Llantwit Major, Llandough. Barry, *D.* Cwrtyr Ala, *Cardiff Nat. Soc. Proc.* 1867. 8. Very common. 9. Common.

E. hirsutum L. Common.—× *montanum.* 8. Aberdare.

E. parviflorum Schreb. Well distributed; locally common.—× *roseum.* 8. Aberdare.

E. montanum L. Common.—f. *minor aprica.* 8. Aberdare.—× *obscurum.* 3. Swansea, *J. Bot.* 1892, p. 297. 8. Aberdare.—× *parviflorum.* 8. Aberdare.— × *roseum.* 3. Swansea, *J. Bot.* 1892, p. 297. 8. Aberdare.

**E. lanceolatum* Seb. & Maur. 5. Aberafan. 8. Aberdare.

E. roseum Schreb. 3. Crumlin Bog and Port Tennant, *Flower.* Swansea, *J. Bot.* 1892, p. 297. 4. Neath. 5. Baglan. 8. Aberdare.

**E. adnatum* Griseb. 5. Port Talbot, Aberafan (f. *stenophylla*). 8. Aberdare, Lavernock, Grangetown. 9. Caerphilly Castle.—× *obscurum.* 5. Port Talbot. 8. Aberdare.

E. obscurum Schreb. Apparently frequent, but no record for 6.—× *palustre.* 1. Oxwich, probably this.

E. palustre L. 1. Oxwich, Rhosili, Cefn Bryn, Llanrhidian. 2. Penllergaer. 3. Crumlin Bog. 4. Glyn Neath, Rhigos. Melincourt Glen, *W. M. R.* 5. Kenfig, *Hb. Motley.* Margam. 6. Near Porthcawl, *Lloyd.* 7. Barry, *D.*! 8. Frequent about Aberdare, Merthyr, Treorchy Graig Fawr, Llantrissant, Welsh St. Donat's, Ystradowen. 9. Caerphilly Common, Lisvane.

Circæa lutetiana L. Common.

Cucurbitaceæ.

Bryonia dioica Jacq. 1. Rare in Gower, *Swansea Sci. Soc. Proc.* 1895–6. 8. Sophia Gardens, Cardiff, and Castell Coch, *Storrie.*

Umbelliferæ.

Hydrocotyle vulgaris L. Common; no record from 7.

Eryngium maritimum L. 1. Oxwich, Broughton Burrows. Penard, *G. C. D.* Paviland, *Swansea Sci. Soc. Proc.* 1892–3. 3. Crumlin Burrows. Swansea and Singleton, *Gutch.* 4. Briton Ferry, *Lightf.* 5. Aberafan, *Hb. Motley.* 6. Porthcawl. 7. Monknash, *Cardiff Nat. Soc. Proc.* 1882. Sully, Barry, the Leys, &c., *Storrie.* 8. Penarth, *Storrie.*

(*E. campestre* L. 5. Port Talbot in three places. 8. Banks of Taff near Cardiff, 1848, F. Brent in *Hb. Brit. Mus.* Quite possibly native.)

Sanicula europæa L. Fairly common.

Conium maculatum L. 1. Frequent. 3. Swansea, *Gutch.* 4. Jersey Marine. 5. Aberafan, Port Talbot. 6. Nottage, near Merthyr Mawr, Ogmore Castle, Ewenny. 7. Frequent and characteristic of the lias series, especially the cliffs. 8. Cardiff Docks, Taffs Well. Penarth, *Storrie.* 9. Caerphilly Castle.

**Smyrnium Olusatrum* L. 1. Oystermouth, hedges about Brough-

ton Bay, Rhosili, Llangenydd. 4. Briton Ferry. 6. S. Cornely, Ogmore Castle. 7. Flat Holme, *J. Bot.* 1891, p. 345. Sully, Porthkerry, Cog, Cold Knap, Aberthaw, St. Donat's. 8. Cardiff, Penarth, Lavernock, Leckwith, *Storrie.* I think native in 1 and 7.

Apium graveolens L. 1. Common in salt marshes. 2. Loughor, Pontardulais. 3. Swansea. Singleton and Port Tennant, *Gutch.* 4. Neath. 5. Port Talbot. 6. Merthyr Mawr. Porthcawl, *Lloyd.* 7. Merthyr Dyfan, Sully, Cadoxton, Lavernock, St. Athan's Road. 8. Cardiff marshes, Lavernock, Penarth, Grangetown. Leckwith, *Storrie.* 9. Pengam marshes.

A. nodiflorum Reichb. fil. Common.—Var. *pseudo-repens* H. C. Wats. 1. Clyne Common, *Hb. Brit. Mus.*

A. inundatum Reichb. fil. 1. Cefn Bryn, Fairwood Common. 2. Gowerton Common. 3. Swansea, *J. Bot.* 1886, p. 112. 6. Porthcawl, *Lloyd.* 8. Welsh St. Donat's.

(*Cicuta virosa* L. 3. Swansea, *Swansea Sci. Soc. Proc.* 1891-2.)

Carum verticillatum Koch. 2. Very common. 3. Swansea, abundant, *Gutch.* Ystalyfera. 4. Hirwaun Common, hills above Neddfechan and Perddyn Glens. 5. Cwm mawr, *Hb. Motley.* 7. St. Lythan's Down, *Nicholson.*

C. majus Rendle & Britten (*Conopodium denudatum* Koch). 1, 4, 7, 8, 9. Frequent. 3. Crumlin Bog. Singleton, *Gutch.* 5. Pyle. 6. S. Cornely.

**Petroselinum segetum* Koch. 6. Mawdlam to S. Cornely and Nottage. 7. Barry, Merthyr Dyfan, Swanbridge.

Sison Amomum L. 3. Swansea, frequent, *Flower & Lees.* 6. S. Cornely to Nottage. 7. Frequent. 8. Lavernock.

(*Sium latifolium* L. 3. Swansea, *Dillwyn.* 6. Near Porthcawl, *Lloyd.* 7. St. Hilary, *Cardiff Nat. Soc. Proc.* 1882. 8. E. Moors, Penarth Road, Leckwith, *Storrie.* Bodringallt, Bwllfa, *Rhondda Fl.* Evidence poor.)

S. erectum Huds. 1. Parkmill, Oxwich, Broughton Bay, Llanrhidian. 2. Loughor marshes. 3. Crumlin Bog. 4. Jersey Marine. Neath Abbey, *W. M. R.* 5. Margam Moors. 6. Merthyr Mawr, Ewenny. 7. Flemingstone Moors, Cowbridge, Llandough, Llantwit Major. Barry, *D.*! 8. Grangetown.

Ægopodium Podagraria L. Frequent; probably native in 4. Perddyn Gorge.

Pimpinella Saxifraga L. 1. Llanmadoc, Caswell Bay, Port Eynon to Oxwich. Langland Bay, *W. M. R.* 3. Town Hill, *Gutch.* 4. Rhigos. 6. Ogmore Down, Ewenny. 7. Llandough, Aberthaw, Sully, Lavernock. Dinas Powys, *Storrie.* 8. Aberdare, Hirwaun, Morlais Castle, Ystradowen Moor, Llantrissant, Penarth, Lavernock. Llandaff, &c., *Storrie.* 9. Craig Llanishen. — Var. *dissecta* With. 5. Craigafan, *Hb. Motley.* 6. S. Cornely. 8. Ystradowen, Aberdare, frequent.

(*P. major* Huds. 6. Porthcawl, *Lloyd.* No specimen seen.)

Myrrhis Odorata Scop. 3. Hilly pastures, *Dillwyn.* 8. Several spots about Aberdare, sometimes looking quite native. M. Tydfil, *Hb. Watson.*

Chærophyllum temulum L. Common.

C. Anthriscus Lam. 1. Llanmadoc, cliffs. 8. Penarth and Cardiff, *Storrie.*

C. sylvestre L. Common.

**Fœniculum vulgare* Mill. Sometimes native. 1. Langland and Caswell Bays, *W. M. R.* Parkmill, Port Eynon. 2. Loughor, *Hb. Motley.* 3. Swansea, casual, *J. Bot.* 1890, p. 157. 4. Jersey Marine. Neath, *W. M. R.* 5. Port Talbot Docks. 6. S. Cornely. Porthcawl, *J. Bot.* 1902, p. 316. 7. Flat Holm, *J. Bot.* 1891, p. 345. Barry, *D.* Sully, Cold Knap, Dinas Powys, Aberthaw, St. Donat's. 8. Cardiff Docks, Aberdare, Penarth.

Crithmum maritimum L. 1. Cliffs, Oxwich to Broughton Bay. 5. Port Talbot. 6. Sker to Dunraven. 7. Swanbridge to Nash Point. 8. Penarth, *Hb. Br. Mus.*

Œnanthe fistulosa L. 3. Singleton, *Gutch.* 7. Flemingstone Moor. Barry, *D.* 8. Grangetown. Glyncornel, Bodringallt, &c., *Rhondda Fl.* 9. Lisvane.

(*Œ. pimpinelloides* L. 3. Landore, *B. G.* 8. Cardiff, *Storrie*, = next species, probably.)

Œ. Lachenalii C. Gmel. Common in the salt marshes and sandy burrows all along the coast. Also 7. Merthyr Dyfan, Cadoxton.

Œ. crocata L. Common.

Æthusa Cynapium L. 1. Parkmill, Penclawdd. 2. Loughor. 3. Swansea, *Flower & Lees.* 5. Port Talbot Docks, Mawdlam. 6. Porthcawl. 7. Aberthaw, Ystradowen, Llantwit Major, Cadoxton. 8. Aberdare, Welsh St. Donat's, Ystradowen. Cardiff, *J. Bot.* 1884, p. 257. Penarth, &c., *Storrie.* Pontygwaith, Aberllechau Woods, *Rhondda Fl.* 9. Caerphilly. In the large hedge form a native plant.

Silaus pratensis Bess. 5. Pyle. 6, 7. Frequent. 8. Aberdare, Lavernock, Penarth.

Angelica sylvestris L. No record for 5. Otherwise common.

**Pastinaca sativa* L. Always an escape except 8. Cliffs, Lavernock to Penarth, plentiful and native.

Heracleum Sphondylium L. Common.—Var. *angustifolium* Huds. 1. Penmaen. 8. Aberdare. 9. Lisvane.

Daucus Carota L. 1. Coast, frequent. 2. Gowerton, Mynydd Garngoch, Pantyffynon. 3. Swansea, *Hb. Bicheno.* 5. Port Talbot. 6. S. Cornely, Porthcawl sands, Southerndown, near Laleston. 7. Common. 8. Aberdare, Cardiff Docks, Taffs Well, Lavernock, Penarth, Grangetown. Penrhys Brook, Bodringallt, &c., *Rhondda Fl.*

D. gummifer Lam. 1. Penard, *Gutch.* Mumbles, *Hb. Br. Mus.* Oxwich. 6. Dunraven, *Storrie.* 7. St. Donat's. Lavernock, *Cardiff Nat. Soc. Proc.* 1882. Fontigary, Colhugh, &c., *Storrie.*

Torilis arvensis Link. 3. Swansea, *Flower & Lees.* 8. Aberdare.

T. Anthriscus Bernh. Common.

T. nodosa Gaertn. 1. Coast, Oxwich to Llanrhidian. 3. Swansea, *Flower.* 5. Kenfig. 6. S. Cornely, Southerndown. 7. The Leys, Cold Knap, Barry. Sully, Swanbridge, *Storrie.* 8. Penarth, &c., *Storrie.* Penrhys Brook, *Rhondda Fl.*

Araliaceæ.

Hedera Helix L. Common.

Cornaceæ.

Cornus sanguinea L. 1. Common on limestone. 3. Port Tennant, *Gutch*. 6 and 7. Common. 8 and 9. Frequent off the coal measures. 8. Glyncornel, *Rhondda Fl.*

Caprifoliaceæ.

Adoxa Moschatellina L. 1. Killay, Black Pill to Bishopston, Blue Anchor, &c., to Llanmadoc. 3. Swansea, *Flower & Lees*. 4. Perddyn Glen. 5. Baglan to Port Talbot, Pyle. 6. Ewenny. 7. Sully, *Storrie*. Barry, *D.*! 8. Aberdare, Merthyr to Morlais, Leckwith Woods. Cardiff, *Storrie*. 9. Penylan, *Storrie*.

Sambucus nigra L. Common.

Viburnum Opulus L. 1. Killay, &c., Parkmill. Langland Bay, *W. M. R.* 2, 4, 8, 9. Common. 3. Sketty. 6. Bridgend. 7. Wenvoe, Porthkerry. Barry, *D.*!

V. Lantana L. 1. Langland Bay, *W. M. R.* Caswell Bay. 6, 7, and the limestone of 8. Common.

Lonicera Periclymenum L. Common, from seashore up to highest mountain cliffs.

Rubiaceæ.

Rubia peregrina L. 1. Very common on south coast; Llanmadoc. 3. Swansea, *Hb. Babington*. 6. Ewenny, Monknash. Southerndown, *Cardiff Nat. Soc. Proc.* 1876. 7. Common. 8. Penarth, *Hb. Cardiff*. Taffs Well. Castell Coch, *Storrie*.

**Galium boreale* L. 4. Craig-y-llyn, *A. Ley*. 8. Castell Coch and Penarth, *Storrie*.

G. Cruciata Scop. 1. Common. 2. Pontardulais to Pantyffynon. 3. Crumlin Burrows. Fabians Bay, *Gutch*. Glais to Pontardawe, *Swansea Sci. Soc. Proc.* 1893. 4. Rhigos Hill, Glyn Neath, Resolven, Neath. 5. Pyle. 6. Ewenny, Porthcawl to S. Cornely, Llandow. 7. Llantwit Major, Ystradowen. Barry, *D.*! 8. Fairly frequent. 9. Cefn On, Ruperra, Rudry, Llanishen.

G. verum L. 1, 6, 7. Common. 3. Swansea, *Hb. Cardiff*. 5. Aberafan and Port Talbot. 8. Morlais Castle, Peterston, Lavernock, Penarth, Grangetown. 9. Llanishen, &c., *Storrie*.—Var. *maritimum* DC. 1, 3, 4, 5, 6. Frequent on the burrows. 7. The Leys westward, Stalling Down, Barry Island.

G. Mollugo L. 1. Rhosili, Llangenydd, Parkmill, Mumbles Road. 3. Swansea, *Gutch*. 5. Port Talbot. 6. Ewenny, Newton sandhills. 7. Very common. 8. Aberdare. The lowlands. Penygraig, Wattstown, &c., *Rhondda Fl.* 9. Penylan, &c., *Storrie*.

G. saxatile L. Common on the hills, scarcer elsewhere.

**G. umbellatum* Lam. 8. Morlais Castle, plentiful.

G. palustre L. Common.—Var. *elongatum* (Presl.). 1. Oxwich. 3. Killay, Crumlin Burrows. 4. Neath. 5. Baglan Moors, Port Talbot. 7. Llantwit Major. 8. Peterston, Aberdare. — Var.

Witheringii (Sm.). 3. Swansea, *Flower & Lees.* 4. Neath, *W. M. R.* 8. Aberdare.

G. uliginosum L. 1. Rhosili. 3. Swansea, *Flower & Lees.* 5. Baglan to Aberafan by the moors. 8. Peterston, Mountain Ash, Aberdare.

G. Aparine L. Common; but no record for 9.

Asperula odorata L. 1. Bishopston to Black Pill, Llanrhidian. Penmaen, *Swansea Sci. Soc. Proc.* 1893. Clyne Wood, *Gutch.* 3. Glanrhyd Woods, Pontardawe, *Swansea Sci. Soc. Proc.* 1893. Port Tennant, *Gutch.* 4. Rhigos Hill, Ysgwd Eynon Gam, Pontwhalby, Pontneddfechan. 6. Porthcawl, *Lloyd.* 7. Wenvoe. Barry, *D.* 8. Fairly common. 9. Lisvane.

A. cynanchica L. 1. Sandhills and cliffs, common; Langland Bay to Broughton Burrows. 3 and 4. Swansea to Neath, *Gutch.* 5 and 6. On the burrows. 6. S. Cornely, Ogmore Down. 7. Barry, *D.*

Sherardia arvensis L. 1. Cliffs and sands, Langland Bay to Llangenydd. 3. Swansea, fields, *Flower & Lees.* 5. Port Talbot, Kenfig Sands, &c. 6. Porthcawl to S. Cornely, Candleston, Ewenny. 7. Porthkerry, Dinas Powys, Sully, Llantwit Major to St. Donat's. 8. Aberdare. Leckwith, Llandough, Penarth, &c., *Storrie.* Ystrad, *Rhondda Fl.* 9. Cefn On. Penylan, *Storrie.*

Valerianeæ.

Valeriana dioica L. 3. Swansea, *Flower & Lees.* Glanrhyd, *Swansea Sci. Soc. Proc.* 1893. 4. Neddfechan and Perddyn Gorges. 8. Frequent Hirwaun, Aberdare, Merthyr Tydfil, Pontsarn, Ystradowen Moor. Mardy, Pontrhondda, &c., *Rhondda Fl.* 9. Caerphilly, Lisvane. Llanishen, *D.*

**V. Mikanii* Syme. 4. Glyn Neath. 8. Merthyr Tydfil. Cwm Selsig and other cliffs of the Rhondda Valley.

V. sambucifolia Willd. 2, 4, 8, 9. Common. 1. Parkmill, Nicholaston Woods, Pwlldu, Whitford Burrows. 3. Swansea, *Flower & Lees.* Ystalyfera. 5. Port Talbot. 6. Southerndown, *Cardiff Nat. Soc. Proc.* 1873. 7. Cowbridge, Llandough.

Valerianella olitoria Poll. 1. Limestone and sand, common. 3, 4, 5. On the burrows. 6. Ogmore Castle. Porthcawl, *Lloyd.* 7. Porthkerry, Fontigary. 8. Penarth, St. Fagan's, Peterston, &c., *Storrie.*

**V. carinata* Loisel. 4. Aberpergwm. ? Native.

V. rimosa Bast. 1. Norton, *Woods.* 3. Fabians Bay, *Gutch.* ? Native.

V. dentata Poll. 1. Llanmadoc, Port Eynon, Oxwich. 5. Kenfig, *Hb. Motley.* 6. Nottage to S. Cornely. Southerndown, *Storrie.* 7. Sully, St. Andrew's, *Cardiff Nat. Soc. Proc.* 1891–2. 8. Welsh St. Donat's. 9. Caerphilly, *Hb. Bicheno.* ? Native.

Dipsaceæ.

Dipsacus sylvestris Huds. 1, 7. Frequent. 2. Pantyffynon, Gowerton. 3. Fabians Bay, *Gutch.* 4. Neath Canal, *Gutch.*

5. Port Talbot. 6. Porthcawl to S. Cornely, near Merthyr Mawr, Ogmore Castle, Ewenny. 8. Off the coal measures.

**D. pilosus* L. 7. Llandough, Cowbridge.

Scabiosa Succisa L. Common.

S. Columbaria L. 1. Coast from Langland Bay to Llanmadoc. 6. S. Cornely.

S. arvensis L. Well distributed; and in 6 and 7 common.

Compositæ.

Eupatorium cannabinum L. Common. — Var. *indivisum* DC. 5. Port Talbot.

Solidago Virgaurea L. 1. Caswell and Langland Bays and Clyne Common, *W. M. R.* Killay to Parkmill, *G. C. D.* 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. Pantyffynon. 3. Ystalyfera. Woods about Swansea, *Flower & Lees.* 4, 8. Common. 9. Pwllypant, Caerphilly, &c., *Storrie.* — Var. *cambrica* (Huds.). 4. Neath Valley, *Flower.*

Bellis perennis L. Common.

Aster Tripolium L. 1. Three Cliffs Bay, Penclawdd, Salthouse Point, Gowerton. 2. Loughor Marshes. 3. Port Tennant, &c., *Flower.* 4. Briton Ferry, *Cardiff Nat. Soc. Proc.* 1882. 5. Aberafan and Port Talbot. 7. St. Athan's Road. Sully, Barry, &c., *Storrie.* 8. Cardiff, Leckwith. 9. Pengam marshes.

(*Linosyris vulgaris* DC. 6. Southerndown, *Storrie.* 7. Barry, *Storrie.* Moggridge sowed the plant in Glamorganshire, and the record must await confirmation.)

Erigeron acris L. 1. Not uncommon. 2. Penllergaer, *Cardiff Nat. Soc. Proc.* 1882. 3. Crumlin Burrows, Ystalyfera. Swansea, *Gutch.* 5. Aberafan, Port Talbot. 6. S. Cornely, Candleston. Southerndown to Nottage, *Cardiff Nat. Soc. Proc.* 1882. 8. Aberdare, Taffs Well. Pentyrch, Troed-y-rhiw, *Cardiff Nat. Soc. Proc.* 1891–2.

Filago germanica L. 1. Cliffs, Three Cliffs Bay to Llanmadoc. 3. Swansea, *Moggridge.* 5. Port Talbot, Aberafan, Kenfig Pool. 6. Merthyr Mawr, Porthcawl, Ogmore Castle. 7. Cowbridge. 8. Cardiff and Penarth, *Storrie.* Pontrhondda, *Rhondda Fl.* 9. Caerphilly.

F. minima Fr. 1. Penard Burrows, Frog Moor. 3. Ystalyfera. 5. Kenfig sands, Aberafan, Port Talbot. 6. S. Cornely, Candleston. Nottage, *J. Bot.* 1902, p. 316. 8. Aberdare; hills above Llwydcoed, among heather; Taffs Well.

Antennaria dioica Br. 4. Mountains above Pontneddfechan, *B. G.* 6. Ogmore Valley, *Storrie.* 8. Morlais Castle. Near Pentre, *Storrie.*

Gnaphalium uliginosum L. Widely but sparsely distributed.

G. sylvaticum L. 3. Drymma and Glanbrane, *Gutch.* 4. March Hywel, *Gutch.* 8. Aberdare and Cynon Valley, *Storrie.*

Inula vulgaris Trev. 1. Limestone frequent. 3. Swansea, *Ball.* 5. Margam, Port Talbot. 6. On the limestone. 7. Fairly frequent. 8. Aberdare, Garth Wood. Penarth, *Storrie.*

I. crithmoides L. 1. Mumbles to Rhosili, locally plentiful. 6. Southerndown, *Storrie.*

Pulicaria dysenterica S. F. Gray. Frequent.

(*P. prostrata* Aschers. 8. Common, Leckwith, &c., *Storrie.* Ballast, Penarth, *Hb. Cardiff.* 9. Roath Ponds, *Storrie.* Awaits confirmation as a native plant.)

Bidens cernua L. 3. Singleton, *Gutch.* 8. St. Fagan's, Coed-riglan, *Storrie.*

B. tripartita L. 1. Quoity Green, Burry Green, Llanrhidian, Salthouse Point. Rhosili, *D.* 2. Mynydd Garngoch. 4. Neath Abbey, *W. M. R.* Near Neath Canal, *Gutch.* 5. Port Talbot. 6. Porthcawl, *Lloyd.* 7. Ystradowen. 8. Merthyr Tydfil, *Cardiff Nat. Soc. Proc.* 1891–2. Aberdare, Penrhiwceiber, Peterston Moor. Cardiff, *Hb. Watson.*

Achillea Millefolium L. Common.

A. Ptarmica L. Widely but rather thinly distributed. No record for 9.

(*Diotis maritima* Cass. 3. Crumlin Burrows, *Swansea Sci. Soc. Proc.* 1891–2. ? Error.)

**Anthemis Cotula* L. 1. Pitton, &c., Llangenydd, Burry Green, Frog Moor, Paviland. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 5. Mawdlam, Port Talbot. Graigafan, *Hb. Motley.* 6. S. Cornely, Tythegston. Near Porthcawl, *Lloyd.* 7. Barry, Sully, Swanbridge, Aberthin, Llantwit Major to St. Donat's. 8. Aberdare, Cardiff, Lavernock. Llantrissant, *Storrie.* 9. Llanishen. Perhaps native in some of these localities.

**A. nobilis* L. 1. Commons and greens, frequent. 2. Mynydd Garngoch. 6. St. Bride's Major. 8. Outcast, Cardiff, *Storrie.*

Chrysanthemum Leucanthemum L. Frequent.

Matricaria inodora L. Fairly frequent; often introduced.—Var. *salina* Bab. 1. Penclawdd, Black Pill. 2. Loughor marshes. 3. Crumlin Burrows. 6. Porthcawl sands. 7. The Leys.

M. maritima L. 1. Cliffs of Mewslade Bay and Paviland. 3. Port Tennant, Salthouse Point, *B. G.*

Artemisia Absinthium L. Widely spread as an escape. Native in 1. at Llanrhidian, Llanmadoc, &c., and perhaps 3. Swansea, *Gutch*, and 9. Pengam marshes.

A. vulgaris L. Frequent. — Var. *coarctata* Forcell. 4. Neath. 5. Port Talbot, Aberafan. 6. Porthcawl to S. Cornely. 7. Monk-nash, Aberthin. 8. Aberdare, Mountain Ash, Hirwaun, &c.

A. maritima L. 1. Llanmadoc, Salthouse Point. 2. Loughor marshes. 3. Port Tennant and Salthouse Point, *Gutch.* 4. Neath Canal, *Gutch.* 5. Port Talbot. 6. Southerndown, *Storrie.* 7. Estuary of the R. Ddaw. 8. Grangetown. 9. Pengam marshes.—Var. *gallica* (Willd.). 3. Near Swansea, *Moggridge.* 8. Cardiff, *Cardiff Nat. Soc. Proc.* 1873.

Tussilago Farfara L. Common.

**Petasites ovatus* Hill. 1. Parkmill, Oxwich. 2. Penllergaer, R. Loughor above Pontardulais. 4. Neath, *W. M. R.* 7. Llan-dough, Llantwit Major. Barry, *D.* 8. Cynon and Taff Valleys in quantity, Ely. 9. Rumney River-banks, *Storrie.*

Senecio vulgaris L. Common.—Var. *radiatus* Koch. 1. Oyster-mouth, *H. & J. G.*! 5. Port Talbot. 7. Barry. 8. Cardiff Docks;

Cogan. Penarth, *Cardiff Nat. Soc. Proc.* 1893. 9. Roath.— × *squalidus*. 8. Cardiff Docks, in small quantity.

S. sylvaticus L. 1. Salthouse Point, Rhosili and the Down, Llangenydd. 2. Penyrheol. 6. Porthcawl, *Lloyd*. 7. Barry, *D.* 8. Aberdare, Cwmaman, Ystradowen, Cardiff Docks. Mardy, *Rhondda Fl.* Penarth, *Storrie*. 9. Pwllypant, *Storrie*. — Var. *lividus* Sm. 8. Aberdare.

S. viscosus L. Doubtful native. 3. Ystalyfera. Swansea Ferry and Crumlin Burrows, &c., *Dillwyn*. 5. Cwmafan, colliery tips, *Dillwyn*. Pyle, Port Talbot. 6. Porthcawl sands, *J. Bot.* 1902, p. 316. 7. Barry. 8. Pentyrch, Cardiff Docks, Aberdare, Hirwaun, Porth. Merthyr Tydfil, *Cardiff Nat. Soc. Proc.* 1891–2.

S. erucifolius L. 3. Swansea, *Flower & Lees*. 5. Kenfig, *Hb. Motley*. Port Talbot. 6. Marcross to Llandow, near Laleston. 7. Common. 8. Lavernock, Penarth, Grangetown.

S. Jacobæa L. Common.

S. aquaticus Huds. Rather common.

(*S. palustris* DC. 5. Aberafan, *Ray* (3rd Itinerary). Ray afterwards says that the locality is in Merionethshire; but I cannot trace an Aberafan there. The marshes at Aberafan (Glam.) might easily have produced the plant, though I can see no sign of it now.)

Carlina vulgaris L. 1. Common. 3. Crumlin Burrows, Ystalyfera. 4. Jersey Marine. 5. Port Talbot and Kenfig sands. 6. Porthcawl, S. Cornely, Ogmore Down to Southerndown. 7. Common near the sea. 8. Penarth, Grangetown, Lavernock, Taffs Well, Morlais Castle, Hirwaun, Aberdare. 9. Cefn On.

**Arctium Lappa* L. (*A. majus* Bernh.). 1. Nicholaston, Parkmill, Oxwich. 6. Copse between Nottage and S. Cornely, near St. Bride's Major. 7. Wenvoe, Llandough (Cowbridge).

**A. nemorosum* Lej. 8. Aberdare.

A. minus Bernh. 1. Oxwich. Langland Bay, *W. M. R.* 4. Aberdylais, Neddfechan Glen. 7. Monknash. Cowbridge, *W. M. R.* 8. Aberdare, Garth Wood.

**A. intermedium* Lange. 1. Parkmill, Three Cliffs Bay, Nicholaston. 7. Wenvoe, Llandough (Cowbridge). 8. Aberdare.

Carduus pycnocephalus L. 1 and 7. Coast, frequent. 2. Loughor and the marshes. 3. Swansea, frequent, *Flower*. 5. Port Talbot. 6. Porthcawl, Southerndown. 8. Grangetown, Penarth. 9. Pengam marshes.

C. nutans L. 1. Coast, frequent. 3. Crumlin Burrows. Singleton, *Gutch*. 4. Jersey Marine. 5. Graigafan, *Hb. Motley*. Aberafan, Port Talbot, Mawdlam. 6 and 7. Frequent. 8. Cardiff. Penarth, Llandaff, *Storrie*. Blaenycwm, *Rhondda Fl.* 9. Pengam marshes, Cefn On.

C. crispus L. 1. Parkmill, Llanrhidian. 3. Swansea, *Dillwyn*. 6. Bridgend. 7. Common. 8. Peterston. Penrhys, *Rhondda Fl.* Cardiff, Penarth, &c., *Storrie*.—Var. *acanthoides* (L.). 1. Parkmill. 7. M. Dyfan, Monknash, Barry, Llantwit Major. — × *nutans*. 7. Near Llantwit Major on the cliffs.

C. lanceolatus L. Common.

C. eriophorus L. 4 and 5. Between Neath and Pyle, *Flower*.

5. Port Talbot Docks. 6 and 7. Frequent on calcareous soil. 8. Penarth, *Storrie*. Castell Coch, *Cardiff Nat. Soc. Proc.* 1873.

C. palustris L. Common : also *fl. albo*.

**C. tuberosus* L. 7. Nash Point and neighbourhood. Apparently this species, and so first recorded by Westcombe (*Phyt.* i. 780); though afterwards referred to *C. Woodwardii* H. C. Wats.

C. pratensis Huds. Common in the hills in 2, 3, 4, 8, 9. 1. Rhosili, Whitford Burrows and marshes. 5. Pyle. 6. Porthcawl sands. Pencoed, *Storrie*. 7. Cadoxton.

(*C. heterophyllus* L. 7 or 8. Road between Llandaff and Cowbridge, *B. G.* ? Error.)

C. acaulis L. 1. Paviland, *Swansea Sci. Soc. Proc.* 1892–3. 4. Briton Ferry, *Gutch*. 7. Barry to Aberthaw, *D.* Nash Point, local; coast east of Llantwit Major. 9. Cefn On.—Var. *caulescens* Syme. 7. Coast east of Llantwit Major.— × *pratensis* (= *C. Woodwardii* H. C. Wats.). 8. Cardiff Docks.

C. arvensis Robson. Common : also *fl. albo*.—Var. *mitis* Koch. 5. Port Talbot. 8. Cwmdare.

**Onopordon Acanthium* L. 7. Llantwit Major, very rare, but looking quite native. 8. Ballast, Cardiff, *Storrie*.

Serratula tinctoria L. 1. Rhosili, Broughton Bay, Horton Cliffs. Langland Bay, *W. M. R.* 2. Common. 3. Swansea, *Gutch*. 4. Glyn Neath, R. Perddyn. 7. M. Dyfan, Wenvoe, Sully. 8. Common. 9. Near New Cemetery, Penylan, Llanishen, Caerphilly, *Storrie*. — Var. *monticola* (Boreau). 2. Mynydd Garngoch. 8. Fedwhir near Aberdare.

Centaurea nigra L. Common. The rayed form is the more common about Bridgend, &c.; the less common in districts 1, 2, 3, 4, 8, 9. — Var. *decipiens* (Thuill.). 6. Ewenny. 7. Barry to Bonvilstone.

C. Scabiosa L. 1, 6, 7. Common. Penllerguer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Kilvey Hill, *Gutch*. 4. Glyn Neath. 5. Port Talbot to Pyle. 8. Common, except in the hills. 9. Llanishen, near Ruperra.—Var. *succisæfolia* Marshall. 1. Cliffs at Port Eynon and Paviland.

Cichorium Intybus L. 1. Common at Caswell and Langland Bays, *W. M. R.* Oxwich, *S. W. Jenkins*. Pitton, Llangenydd, Llanmadoc to Llanrhidian. 3. Kilvey Hill, *Gutch*. 4. Neath, *W. M. R.* 5. Port Talbot Docks. 6. S. Cornely. 7. Wenvoe, *Storrie*. St. Athan's Road. 8. Aberdare, Cardiff Docks. St. Fagan's, Whitchurch, &c., *Storrie*.

Lapsana communis L. Rather common.

Picris hieracioides L. 1. South coast, frequent. Llanrhidian. 3. Swansea, *Flower & Lees*. 4. Neath Abbey, *W. M. R.* 5. Pyle, *Hb. Motley*. 6. Porthcawl to S. Cornely. 7. Common. 8. Penarth, Grangetown, Lavernock.—Var. *arvalis* (Jord.). 5. Port Talbot.

Helmintia echioides Gaertn. 1. Overton. 3. Swansea, *Flower & Lees*. 5. Port Talbot. 6. Porthcawl sands. 7. Common. 8. Cardiff, Lavernock, Penarth, Grangetown. 9. Roath, Pengam marshes.

Crepis capillaris L. (*C. virens* L.). Frequent, but no record for 9.

—Var. *agrestis* Waldst. & Kit. 5. Port Talbot. 7. Llandough, Cadoxton. 8. Aberdare, Taffs Well, Cardiff Docks. 9. Ystradmynach, Caerphilly, Roath, Ruperra, Llanishen.

**C. biennis* L. 1. Oxwich Bay, *Ley*. 7. Sully. Near St. Athan's, *Storrie*. 8. Aberdare. ? Native.

C. paludosa Moench. 4. Perddyn Gorge. (8. Bog above Pontrhondda, *Rhondda Fl.* 9. Llanishen, Caerphilly, &c., *Storrie*.)

In *Hieracium* the starred forms are those not given for Glamorgan in W. R. Linton's Handbook.

Hieracium Pilosella L. Common.—*Var. *concinnatum* Hanb. Probably plentiful. 7. Barry Island. 8. Hirwaun, Taffs Well. 9. Caerphilly, &c.

**H. Schmidtii* Tausch. 4. Craig-y-llyn.—Var. *eustomon* Linton. 1. Cliffs, Pwlldu to Penard, Oxwich Bay, near Rhosili, north of Burry Holm.

H. lasiophyllum Koch var. *euryodon* Hanb. 4. Craig-y-llyn. 8. Daren Bwllfa near Aberdare.

H. nitidum Backh. var. *siluriense* Hanb. 4. Craig-y-llyn, *Ley*. 8. Cliffs at top of Rhondda Valley.

**H. argenteum* Fr. 4. Craig-y-llyn. 8. Graig Fawr, Treorchy.

**H. hypochæroides* Gibs. var. *saxorum* Hanb. 4. Craig-y-llyn.

H. cambricum Hanb. 8. Graig Fawr, Treorchy.

H. pellucidum Laestad. 4. Glyn Neath to Hirwaun, Pencaedrain, Perddyn Gorge. 8. Common at Aberdare, Merthyr Tydfil, Taffs Well. 9. Frequent on the hills about Caerphilly.—*Var. *lucidulum* Ley. 4. Craig-y-llyn, Hirwaun to Glyn Neath. 8. Morlais Castle.

**H. serratifrons* Almq. var. *Cinderella* Ley. 4. Common in woods above Glyn Neath. 7. Sully. 8. Taffs Well to Pentyrch, abundant. 9. Caerphilly and Llanishen hill-range. — Var. *lepistodes* Johanns. 4. Hirwaun to Glyn Neath.

H. subulatidens Dahlst. var. *cuneifrons* Ley. 4. Glyn Neath. Craig-y-llyn, *Ley*.

**H. platyphyllum* Ley. 8. Daren Bwllfa, Aberdare.

H. cæsium Fr. 4. Craig-y-llyn.

**H. acroleucum* Stenstr. var. *mutabile* Ley. 2. Gowerton. 4. Pontneddfechan, *Ley*. 8. Aberdare.

**H. irriguum* Fr. 8. Hirwaun.

H. sciaphilum Uechtr. 4. Glyn Neath, *J. Bot.* 1893, p. 197. Rhigos. Neath, *W. M. R.* 5. Aberafan, Port Talbot. 6. Porthcawl. 8. Aberdare, abundant; Taffs Well, Ystradowen. 9. Caerphilly Castle, Craig Llanishen, Lisvane, Llanishen. Most of these records probably refer to *H. cacuminatum*. —Var. *amplifolium* Ley. 8. Aberdare, &c., abundant.

**H. anfractum* Fr. subsp. *cacuminatum* Dahlst. 1. Gowerton. 2. Common. 3. Ystalyfera, Crumlin Bog. 4. Frequent. 6. Ewenny Down. 8. Graig Fawr, Treorchy. — *Var. *barbareæfolium* Lönnr. 8. Hirwaun.

**H. septentrionale* Arv.-Touv. 4. Rhigos and Glyn Neath, *Ley*. Pencaedrain. 5. Aberafan sandhills. 8. Aberdare.—Var. *amphibolum* Lindeb. 4. Glyn Neath. 6. Glyn Corwg, *Ley*. 8. Aberdare; Graig Fawr, Treorchy, and other cliffs in the Rhondda Valley.

**H. scanicum* Dahlst. 3. Ystalyfera, Crumlin Burrows. 4. Common. 5. Aberafan Moors and sandhills, Port Talbot. 6. Ewenny Down. 7. Aberthaw. 8. Common.

H. stictophyllum* Dahlst. 4. Craig-y-llyn, *Ley*.—Var. *serpentinum* Hanb. 8. Aberdare, very rare.

**H. sparsifolium* Lindeb., var. *strigosum* Ley. 8. Cliffs at head of Rhondda Valley.

H. cantianum Hanb., var. 8. About Aberdare.

H. tridentatum* Fr. 8. Copse, Tregibbon, Aberdare.—Var. *setigerum* Ley. 4. Craig-y-llyn, *Ley*. 8. Hills south-west of Aberdare, *Ley*. Werfa Wood, Aberdare.—Var. *calcaricolum* Hanb. 8. Llwydcoed, near Aberdare, very rare.—**Var. *Friesii* Dahlst. 8. Old quarry, and Graig Fawr, Treorchy.—Var. *obatrescens* Dahlst. 8. Aberdare, very rare.

**H. corymbosum* Fr. 4. Craig-y-llyn, *Ley*. 8. Aberdare.

H. boreale Fr. 1. Parkmill, Oxwich. 2. Gowerton, Pantyffynon to Pontardulais. 3. Kilvey Hill, *Gutch*. Ystalyfera. 4. Neath, Neddfechan Glen, Perddyn Gorge, Resolven, Rhigos. 5. Port Talbot, Pyle. 8. Aberdare, Hirwaun, Porth, cliffs of Rhondda hills, Taffs Well, Cardiff Docks. 9. Caerphilly, Cefn On.

H. umbellatum L. 1. Broughton Bay. Langland Bay, *W. M. R.* Hedges near Overton, *Hb. Br. Mus.* 2. Groes Eynon and Penllergaer, *Hb. Motley*. 4. Neath Canal, *Gutch*. Pontneddfechan, *Hb. Br. Mus.* 8. Aberdare and Hirwaun. Llandaff, *Storrie*.

**Hypochæris glabra* L. 6. Porthcawl sands.

H. radicata L. Common.

Thrincia nudicaulis Britten. Well distributed; common in 1, 8.

Leontodon hispidus L. Common.

L. autumnalis L. 1. Langland Bay, *W. M. R.* Penard to Killay, *G. C. D.* Llanmadoc. 3. Swansea, *Gutch*. Ystalyfera. 4. Neath, *Hb. Br. Mus.* Resolven. 6. Porthcawl to S. Cornely. 7. Barry, Cadoxton, &c., The Leys, St. Athan's, Cowbridge, Llandough. 8. Aberdare, Hirwaun, Cardiff. Llandaff, St. Fagan's, &c., *Storrie*. Rhondda Valley, common, *Rhondda Fl.*

Taraxacum officinale Web. Very common.—Var. *erythrospermum* (Andrz.). 1. Cliffs of Gower. 4. Hirwaun to Glyn Neath. 5. Kenfig Sands, Port Talbot. 7. Swanbridge. 8. Aberdare, Taffs Well, Morlais Castle.—Var. *lævigatum* D.C. 1. Penard, Rhosili, Whitford Burrows, Broughton Sands. 3. Sketty Burrows. 7. Barry, Sully Island.—Var. *palustre* (D.C.). 8. Aberdare, frequent; Mountain Ash.—Var. *udum* (Jord.). 1. Common. 4. Glyn Neath, Jersey Marine, Perddyn Gorge and hills above. 5. Sands, frequent. 6. S. Cornely, Ewenny. 7. Marcross, Barry Island, Swanbridge, Fontigary. 8. Aberdare, Hirwaun, Dowlais to Rhymney, Pontsarn and Morlais Castle.

Lactuca virosa L. 1. Oystermouth Castle, *Flower*. 3. Crumlin Bog. 5. Port Talbot Docks. 6. Porthcawl, *J. Bot.* 1902, p. 317. 7. Barry. 8. Cardiff, Grangetown. Doubtfully native.

L. muralis Fresen. 1, 4, 6, 8, 9. Common. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Glais to Pontardawe, *Swansea Sci. Soc. Proc.* 1893. Ystalyfera. 7. Cadoxton, Wenvoe, Dinas Powys, Aberthin to Ystradowen.

Sonchus oleraceus L. 1. Frequent. 2. Gowerton, Pontardulais and above. 3. Swansea, *Flower*. 4. Neath, *W. M. R.* Pontneddfechan. 5. Port Talbot. 7. Barry, Lavernock, Cowbridge, Leys, St. Athan's, &c. 8. Aberdare, Cardiff, Penarth, Grangetown, Lavernock. Rhondda Valley, common, *Rhondda Fl.* 9. Caerphilly.—Var. *glandulosus* Coss. et Germ. 8. Cardiff Docks.

S. asper Hill. 1. Oxwich, Penmaen, Llanmadoc. Killay to Penard, *G. C. D.* Langland Bay, *W. M. R.* 2. Gowerton, Pontardulais and above. 3. Swansea, *Flower*. 4. Neath, Resolven. 5. Graigafan, *Hb. Motley*. 6. Porthcawl, frequent. 7. East half, frequent. 8. Cardiff, Aberdare, Hirwaun.

S. arvensis L. Frequent (no record for 2) and native on the coast, *e.g.*, at 9. Pengam Marshes.—f. *angustifolius*. 3. Swansea. 6. Porthcawl.—Var. *glabrescens* Hall. 5. Port Talbot Docks.

Tragopogon pratense L. 1. Gowerton. 3. Singleton Marsh, *Gutch*. 5. Port Talbot. 6. Bridgend, Laleston, Ogmore Castle. 7. Frequent. 8. Aberdare, Hirwaun, Penarth. 9. Roath. ? Native.

Campanulaceæ.

Lobelia Dortmanna L. 4. Llynfawr, Llynfach.

Jasione montana L. Well distributed and common in the hills.—Var. *littoralis* Fr. 5. Aberafan. 6. Sker.

Wahlenbergia hederacea Reichb. 2. Penllergaer, above Pontardulais. 3. Glanrhyd, Pontardawe, *Swansea Sci. Soc. Proc.* 1893. Cwm Clydach, &c., *Dillwyn*. 4. Frequent, *B. G.* 5. Glyncorrwg, *Hb. Motley*. 8. Pontypridd, *B. G.* Hirwaun and Aberdare, Cwmparc, Pentyrch, *Cardiff Nat. Soc. Proc.* 1873. Tylacoch, *Rhondda Fl.* St. Fagan's, Quaker's Yard, &c., *Storrie*. 9. Caerphilly, *Storrie*.

Campanula glomerata L. 3. Swansea, *Flower*. 6. Southerndown, *Hb. Cardiff*. 7. Nash Point and westwards, Monknash. 8. Penarth, &c., *Storrie*.

C. Trachelium L. 1. Penrice. 6. Llandow. 7. Cowbridge. Barry, *D.* St. Andrews, St. Hilary, *Storrie*. 8. St. Fagan's, *Storrie*.

**C. latifolia* L. 6. Merthyr Mawr. 7. Cowbridge, *Storrie*. 8. Coedriglan, *Storrie*.

(*C. rapunculoides* L. 6. Merthyr Mawr, *J. Bot.* 1902, p. 317.)

C. rotundifolia L. 1. Penard, Mewslade, &c., Paviland, Llanmadoc. Newton Cliff and Langland and Caswell Bays, *W. M. R.* 2. Penllergaer. 3. Kilvey and Town Hills, *Gutch*. Ystalyfera. 4. Craig-y-llyn. 6. Sands at Porthcawl, Ewenny Down. 7. Barry, *D.* Golden Mill, Cowbridge, *Cardiff Nat. Soc. Proc.* 1882. 8. Aberdare, scarce. Padell-y-Bwlch, Morlais Castle, Taffs Well, Graig Fawr, Treorchy. 9. Penylan, &c., *Storrie*.

(*C. patula* L. Reported from the Vale of Glamorgan, *Dillwyn*.)

Vacciniaceæ.

Vaccinium Vitis-idæa L. 4. Llynfawr and Llynfach, *British Assoc. Handbook*. 8. Padell-y-Bwlch. Nant-y-gwddon, above the

waterfall, *Rhondda Fl.* *Top. Bot.* record is from Caermarthenshire (Llyn-y-fan-fawr).

V. Myrtillus L. Frequent in the uplands. Also 1. Clyne Wood. 8. Taffs Well, Pentyrch. No records from 6 and 7.

V. Oxycoccos L. 2. Penllergaer, *Gutch.* 3. Swansea, *Gutch.* 4. Hills near Pontneddfechan, *B. G.* 5. Above the Varteg, *Hb. Cardiff.* Mynydd Emroch, *Hb. Motley.* 8. Ystradowen Moor, hills about Aberdare. Llantrissant, *Cardiff Nat. Soc. Proc.* 1882. 9. Caerphilly, *Hb. Bicheno.* Cefn On, *Storrie.*

Ericaceæ.

Andromeda Polifolia L. 3. Crumlin Bog, *Hb. Br. Mus.*

Calluna vulgaris Hull. Common; no records from 7.

(*Erica ciliaris* L. 8. Llantwit Fardre, *D.* I have seen no specimen.)

E. Tetralix L. Common; no records from 7.

E. cinerea L. Common in the lowlands; much less common in the hills. No records from 9.

(*E. vagans* L. 1. Near Newton, *B. G.* 2. Pontardulais, *B. G.*)

(*E. mediterranea* L. 2. Pontardulais, *B.G.*)

Pyrola minor L. 4. Near Ysgwd Eynon Gam, *Dillwyn.* This may be Breconshire.

**P. secunda* L. 4. Craig-y-llyn.

Monotropeæ.

(*Monotropa Hypopitys* L. 5. Margam Woods, *Dillwyn.* 8. St. Fagan's, *Storrie.* I have seen no specimen.)

Plumbagineæ.

Limonium vulgare Mill. 1. Whitford Burrows, Oxwich Bay. Port Eynon, *Flower & Lees.* 2. Loughor. 4. Near Neath, *Westcombe.* 5. Port Talbot. 6. Southerndown, *Cardiff Nat. Soc. Proc.* 1873. 7. Barry, and mouth of R. Ddaw, *Storrie.* 8. Mouth of R. Ely, *Storrie.* 9. Pengam Marshes. — f. *pyramidale* Syme. 1. Oxwich Bay.

L. binervosum C. E. Salmon. 1. Rocks, Oystermouth to Burry Holm. 7. Barry, Boverton to Llantwit Major. Sully Island, *Hb. F. Townsend.*

Statice Armeria L. All, I believe, in the form *A. pubescens* Link. 1. Frequent. 2. Loughor. 6. Porthcawl, R. Ogmore mouth. Southerndown, *Cardiff Nat. Soc. Proc.* 1873. 7. Barry Island, Llantwit Major, St. Athan's Road, Aberthaw. Sully, *Storrie.* Flat Holme, *J. Bot.* 1891, p. 345. 8. E. Moors, Penarth, &c., *Storrie.* 9. Pengam Marshes.

Primulaceæ.

Primula vulgaris Huds. Common except on the coal measures. No record from 2.—Var. *caulescens* (Koch). 1. Llanmadoc.

P. veris L. 1, 5, 6, 7, 8, 9, common off the coal measures. No records for 2, 3, 4.— × *vulgaris.* 1. Llanmadoc. 5. Baglan.

6. Ewenny. 7. Barry, *D.* Ystradowen, *Mrs. Owen.* 8. Cogan, St. Fagan's, St. George's, *Storrie.*

Lysimachia vulgaris L. 2. Frequent. 3. Crumlin Bog, Killay. Glais to Pontardawe, *Swansea Sci. Soc. Proc.* 1893. 4. Neath, Jersey Marine. 5. Kenfig Pool. 7. Llantwit Major, *Storrie.* 8. Hirwaun. Llancaiach, *B. A. Williams.* Llanharry, Ystradowen Moor, Taffs Well. Cardiff, *Storrie.* 9. Pwllypant, *Storrie.*

L. Nummularia L. 2. Pontardulais and above. 3. Swansea, *Flower & Lees.* 4. Glyn Neath. 6. Pencoed, Tondu, &c., *Storrie.* 7. Fonmon, *D.* Wenvoe, Cowbridge, Llandough, Flemingstone Moors. 8. Aberdare, Ystradowen Moor, Peterston. Cardiff, St. Nicholas, *Storrie.* Llantwit Fardre, *D.* Gelli, *Rhondda Fl.* 9. Llanishen, *Storrie.*

L. nemorum L. Common.

Glaux maritima L. On the coast in every district.

Anagallis arvensis L. Common; characteristic of the sand-hills.—Var. *carnea* Schrank. 6. Ogmore Castle, *E. S. M.*

A. tenella Lightf. Very common.

Centunculus minimus L. 1. Fairwood Common, Oxwich Bay. Penard Sands, *Ball.* 5. Kenfig Pool. 8. Welsh St. Donat's.

Samolus Valerandi L. 1. Coast, frequent; Quoity Green. 2. Loughor. 3. Tennant's Canal, *Hb. Cardiff.* Crumlin Burrows, *Hb. Bicheno.* 4. Jersey Marine, Neath. 5. Aberafan to Baglan, Kenfig Pool. 6. Porthcawl. Dunraven, *Storrie.* 7. St. Donat's. Cowbridge, *Cardiff Nat. Soc. Proc.* 1882. Barry, Boverton, *Storrie.* 9. Llanishen, *D.* Pwllypant, *Storrie.*

Oleaceæ.

Fraxinus excelsior L. Common.

Ligustrum vulgare L. Common. Native on limestone.

Gentianeæ.

Blackstonia perfoliata Huds. 1. Frequent. 3. Between Drymma and Gwernllwynchwith, &c., *Gutch.* 4. Neath, *Gutch.* 5. The sands. 6. Merthyr Mawr and the Warren, Llantwit Major to Southerndown Road. Coast to Southerndown, *Storrie.* 7. Aberthaw to Lavernock. 8. Welsh St. Donat's, Penarth, Lavernock, Grangetown. Aubrey Arms, *W. F. Evans.* 9. Ruperra, Llanishen, Rudry.

Centaurion umbellatum Gilib. (*C. minus* Moench). Common.—Var. *capitatum* Koch. 1. Near Worms Head, Port Eynon. Langland Bay, *W. M. R.* Whitford Burrows, *J. Bot.* 1892, p. 297. 3. Crumlin Burrows. 5. Port Talbot, Kenfig Pool. 6. Sker to Porthcawl.

C. vulgare Rafn. 1. Mumbles, *Gutch.* 3. Crumlin Burrows, *Dillwyn.* 5. Kenfig Pool, *J. Bot.* 1902, p. 249. Other records doubtful.

C. pulchellum Druce. 1. Worms Head, *B. G.* Beyond Mumbles, *Flower.* Whitford Burrows, *Hb. Motley.* Oxwich Burrows, Port Eynon. 3. Swansea, *Hb. Bicheno.* Salthouse Point, *Flower.* Crumlin Burrows, *B. G.* 5. Kenfig Sands, Margam

Moors. 6. Porthcawl Sands. 7. The Leys. St. Donat's, *Cardiff Nat. Soc. Proc.* 1882.

C. capitatum Rendle & Britten.—Var. *sphærocephalum* Towns. 1. Langland Bay, *W. M. R.* 6. Porthcawl to Sker, *Hb. Br. Mus.* 8. Welsh St. Donat's, six miles from the sea.

(*Gentiana Pneumonanthe* L. 1. Oystermouth to Newton, *Nicholson.*)

**G. Amarella* L. 1. Oxwich and Whitford Burrows. 6. Ewenny. 7. Barry Island. St. Hilary Down, *Storrie.* 9. Cefn On, *Storrie.*

G. campestris L. 6. Porthcawl, *J. Bot.* 1902, p. 317. Maesteg, *Cardiff Nat. Soc. Proc.* 1873. Bridgend, *Storrie.* (7. Barry, *Storrie.*) 8. Rhigos. Some of these probably refer to *G. baltica* Murb.

Menyanthes trifoliata L. 1. Oxwich, Fairwood Common, Killay, Llangenydd. Rhosili, *F. H. Worsley-Benison.* 2. Penllergaer, Mynydd Garngoch. 3. Crumlin Bog. 4. Jersey Marine, Llynfawr, Llynfach. 5. Marshes all along the coast. 6. Porthcawl, *Lloyd.* 7. Gigman Bridge, *Storrie.* 8. Not uncommon. 9. Llanishen, *D.* Lisvane.

Boragineæ.

Cynoglossum officinale L. Frequent on sea-sands: also on the limestone. No record for 9.—Var. *subglabrum* Mérat. 5. Kenfig. 6. Merthyr Mawr.

Symphytum officinale L. 1. Mumbles, *W. M. R.* Llangenydd. 3. Ystalyfera. 5. Port Talbot. 6. Merthyr Mawr. 7. Aberthin, Cadoxton. 8. Aberdare, Mountain Ash, Cwmparc. Blaenrhondda Brook, *Rhondda Fl.* Cardiff, *Storrie.* 9. Ruperra.—Var. *patens* (Sibth.). 3. Swansea, *Flower & Lees.* 5. Port Talbot. 8. Taffs Well.

Anchusa sempervirens L. 4. Neath Abbey, *Flower.* 5. Baglan, *B.G.* Briton Ferry, *Dillwyn.* 6. Cornely, *Dillwyn.* Merthyr Mawr. Bridgend, *Storrie.* 7. Aberthin, Marcross. 8. Fairly frequent. Perhaps a native.

Lycopsis arvensis L. 1. Sandy and pebbly beach from Penard to Whitford Burrows. 3. Tennant's Canal, *Hb. Cardiff.* 5 and 6. The sands. 7. Sully, *Storrie.* 8. Aberdare. E. Moors, St. Fagan's, &c., *Storrie.* Undoubtedly native in 1, 5, 6.

Myosotis cæspitosa F. Schultz. Common.

M. scorpioides L. 3 and 4. Crumlin Bog. 5. Aberafan, *Hb. Motley.* 6. Ewenny. 7. How Mill, Cadoxton, Barry to Bonvilstone, Flemingstone Moor. 8. St. Fagan's, Culver House, *Storrie.* 9. Llanishen, *D.*—Var. *strigulosa* Mert. & Koch. 4. Neath, *W. M. R.* 8. Aberdare.

M. repens G. Don. Not common but widely distributed. Not in dist. 6.

M. arvensis Lam. Common.—Var. *umbrosa* Bab. 7. Sully Island.

M. collina Hoffm. Common on sands of 1, 5, 6. Also 1. Bishopston. 3. Swansea, *Flower & Lees.* 6. S. Cornely. 7. Barry and Sully Islands, Swanbridge. 8. Aberdare. 9. Caer-

philly, *Hb. Cardiff.*—Var. *Mittenii* Baker. 1. Penard and Whitford Burrows. 7. Barry Island.

M. versicolor Reichb. 1. Penard, Penmaen, Llangenydd, and cliffs about Worms Head, Rhosili, &c. 3. Killay, *Swansea Sci. Soc. Proc.* 1892–3. 7. Barry. 8. Aberdare, Hirwaun, Mountain Ash, Taffs Well, Welsh St. Donat's. Llandaff, St. Fagan's, Caerau, *Storrie.*

Lithospermum purpureo-cæruleum L. 1. Oxwich Point. Nicholaston Wood, &c., *Gutch.* Caswell Bay, *N. B. G.* Bishopston and Penrice, *Hb. Watson.* 6. Dunraven, *Hb. Cardiff.* Newton-juxta-Pyle, &c., *Gutch.* Monknash, *Miss F. M. Williams.* 7. Porthkerry. Barry, Boverton, *Storrie.*

L. officinale L. 1. Sands and cliffs frequent. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 6. Merthyr Mawr. 7. St. Donat's to Monknash, Barry Island, Llandough. 8. Garth Wood. Cardiff, *Storrie.*

Echium vulgare L. 1. Oxwich. 3. Crumlin Bog. Near Infirmary and on Town Hill, Swansea, *Gutch.* 4. Jersey Marine. 5. Aberafan to Kenfig, Pyle. 6. Candleston, Porthcawl to S. Cornely. 7. The Leys and westward, Barry. Sully, *Storrie.* 8. Aberdare, Hirwaun, Merthyr Tydfil, Taffs Well. Cardiff, Penarth, &c., *Storrie.*

Convolvulaceæ.

Convolvulus sepium L. Fairly common.—Var. *incarnatus* Wahl. 1. Penrice, *Dillwyn.* 3. Swansea, *Flower.* 4. Between Wych Tree Bridge and Neath, *Dillwyn.*

C. Soldanella L. 1. Mumbles Bay, Port Eynon. Paviland, *Swansea Sci. Soc. Proc.* 1892–3. 3. Crumlin Burrows. Sketty Burrows, *Flower.* 4. Jersey Marine. 5. Port Talbot. 6. Sker Point, *Dillwyn.* Porthcawl Sands. 7. Sully, Barry, Porthkerry, Fontigary, Aberthaw, &c., *Storrie.* 8. Cogan, *Hb. Cardiff.*

C. arvensis L. Common. On sea-sands certainly native.

**Cuscuta europæa* L. 6. Newton sands, not flowering.

Solanaceæ.

Solanum Dulcamara L. Common.—Var. *marinum* Bab. 1. Oxwich. 7. Sully Island.

S. nigrum L. 1. Whitford Burrows. Llanmorlais, *J. Bot.* 1892, p. 296. 5. Port Talbot. 6. Estuary of R. Ogmore. Newton Nottage, *Hb. Motley.* 7. Sully Island, *D.* Flat Holme, *J. Bot.* 1891, p. 345. 8. Aberdare. Cardiff and Penarth, *Storrie.*

**Atropa Belladonna* L. (1. Mumbles, Oystermouth, *Gutch.*) 7. Shore west of the Leys, native. 8. Llandaff, *Gutch.*

Hyoscyamus niger L. 1. Frequent and native. 3. Cwmbwrla. Crumlin Bog, *Gutch.* 4. Neath Canal, *Gutch.* 5. Sea-sands. 6. Porthcawl sands. Sker, *Hb. Br. Mus.* Dunraven woods, *Cardiff Nat. Soc. Proc.* 1876. 7. Sully Island. Llanbleddian, *W. F. Evans.* Barry, *D.* Llantrithyd, *Storrie.* Flat Holm, *J. Bot.* 1891, p. 345. 8. Aberdare. Cardiff Docks. Hirwaun, *J. Davies.* Cardiff, Penarth, &c., *Storrie.*

Scrophularineæ.

Verbascum Thapsus L. Not uncommon. No record for 2.

V. nigrum L. 1. Llanmadoc, and frequent on cliffs. 4. Briton Ferry, *Flower*. 5. Port Talbot Docks. 6. Porthcawl. 7. Llandough. 8. Aberdare.—Var. *Alopecurus* Thuill. 5. Port Talbot Docks.

Linaria Elatine Mill. 1. Horton. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Crumlin Bog. Swansea, *Flower & Lees.* 5. Graigafan, *Hb. Motley.* 6. Porthcawl, *Lloyd.* 7. St. Athan's, Llantwit Major. 8. Lavernock, Cardiff and Penarth, *Storrie.* Doubtful native.

L. spuria Mill. 1. Horton. 3. Swansea, *Flower & Lees.* 6. Porthcawl, *Lloyd.* 7. St. Athan's, Llantwit Major. Barry, *D.* 8. Lavernock. Cardiff and Penarth, *Storrie.* Doubtful native.

L. repens Mill. 1. Gower, *Swansea Sci. Soc. Proc.* 1895–6. 3. Ballast, Swansea, *Rep. B. E. C.* 1901. 4. Ballast, Briton Ferry, *Hb. Br. Mus.* 5. Port Talbot Docks, Aberafan. 6. Porthcawl sands, *J. Bot.* 1902, p. 317. 8. Cardiff, *N. B. G.* Penarth Ferry, *Cardiff Nat. Soc. Proc.* 1892. Doubtful native. — × *vulgaris.* 8. Penarth Ferry, *Cardiff Nat. Soc. Proc.* 1892.

L. vulgaris Mill. Locally common: no record for 4.—f. *peloria.* 8. Penarth Ferry and Grangetown, *Hb. Cardiff.*

L. minor Desf. 3. Swansea, *Flower & Lees.* 5. Port Talbot to Pyle. 6. Railway, S. Cornely. 7. Ystradowen Station. Barry, *D.* 8. Peterston, Aberdare. Penarth, &c., *Storrie.* Doubtful native.

Antirrhinum Orontium L. 6. Porthcawl, *J. Bot.* 1902, p. 317. 8. Penarth, *H. S. Thompson.* Ballast, Cardiff, *Storrie.* ? Native.

Scrophularia aquatica L. Well distributed but not common.—Var. *cinerea* Dum. 1. Gowerton. 8. Peterston, Aberdare.

S. nodosa L. Common.

Limosella aquatica L. b. *tenuifolia* Hook. fil. 3. Crumlin Bog. 5. Kenfig Pool.

Sibthorpia europæa L. 8. Pontypridd, *Hb. Watson.* Cardiff, extinct, *Brit. Assoc. Handb.* 9. Caerphilly, *H. S. Thompson.* Pwllypant, *Storrie.*

Digitalis purpurea L. Very common off limestone.

Veronica hederifolia L. 1. Rather common. 3. Swansea, *Flower & Lees.* 4. Neath, *W. M. R.* 5. Baglan to Aberafan, Kenfig. 6. Porthcawl, *Lloyd.* 7. Gileston, Fontigary. 8. Aberdare, Lavernock. Penrhys Brook, Mardy, *Rhondda Fl.* Penarth, St. Fagan's, &c., *Storrie.*

V. polita Fr. 1. Penard, Llanrhidian, Gowerton. Langland Bay, *W. M. R.* 3. Ystalyfera. Swansea, *Gutch.* 4. Neath, *W. M. R.* 5. Port Talbot, Mawdlam. 6. S. Cornely, Porthcawl. 7. Barry, Porthkerry, Dinas Powys, Cowbridge. 8. Aberdare, Merthyr Tydfil, Taffs Well. Cardiff, *J. Bot.* 1884, p. 257. 9. Caerphilly.

V. agrestis L. 1. Killay to Penard, *G. C. D.* Llanmadoc. 3. Swansea, *J. Bot.* 1892, p. 296. 6. Porthcawl, *Lloyd.* 7. Cadoxton, Swanbridge. Flat Holme, *J. Bot.* 1891, p. 345. 8. Aberdare, Hirwaun. Cardiff, *J. Bot.* 1884, p. 257. Bodringallt, Maindee, &c., *Rhondda Fl.*

V. arvensis L. Common.

V. serpyllifolia L. 1. Common. 2. Penllergaer. 3. Swansea, *Gutch.* 4. Melincourt Glen. 6. Porthcawl, *Lloyd.* 7. Barry, *D.* 8. Aberdare, Mountain Ash, Welsh St. Donat's. Cardiff, *Storrie.* Penrhys, Penpych, &c., *Rhondda Fl.* 9. Caerphilly, Lisvane.

(*V. hybrida* L. 1. Reported by *S. W. Jenkins* from cliffs near Oxwich: also by *Dillwyn* from 'sides of mountains.')

V. officinalis L. Common.

V. Chamædrys L. Common.

V. montana L. 1. Oxwich, Llanmadoc. Langland Bay, *W. M. R.* 4. Fairly frequent. 5. Baglan, *Hb. Motley.* 6. Merthyr Mawr. 7. Barry, *D.* Dinas Powys. 8. Aberdare Valley. Rhondda Valley, *Rhondda Fl.* Taffs Well, Llantrissant. Cardiff, St. Fagan's, &c., *Storrie.* 9. Rudry, Llanishen. Penylan, *Storrie.*

V. scutellata L. 1. Penard, Oxwich, Parkmill, Clyne and Fairwood Commons, Paviland. 2. Gowerton Common, Mynydd Garngoch. 4. Hirwaun Common. Neath, *Flower & Lees.* 5. Margam Moors. Mynydd Sylen, *Hb. Motley.* 6. Porthcawl sands. 7. Barry, *D.* 8. Merthyr, Aberdare, Ystradowen, Welsh St. Donat's. Cardiff, Leckwith, St. Fagan's, &c., *Storrie.*

V. Anagallis-aquatica L. 1. Oxwich, Penard Burrows, Parkmill, Llangenydd and Llanmadoc marshes. 3. Crumlin Burrows. 4. Glyn Neath. 5. Baglan to Margam Moors. 6. Porthcawl, Merthyr Mawr Warren, Ewenny. 7. Nash Point, Llantwit Major, How Mill, Llandough, Cowbridge, Cadoxton to Bonvilstone. 9. Ystradowen, Grangetown. Glyncornel, Maindee, Ton, *Rhondda Fl.*

V. Beccabunga L. Common.

Euphrasia officinalis L. Aggregate common.

E. stricta Host. 8. Aberdare.

E. Rostkoviana Hayne. 1. Gowerton to Penclawdd. 2. Pontardulais to Pantyffynon, Gowerton. 4. Hirwaun Common. 8. Aberdare, Welsh St. Donat's.

E. borealis Towns. 8. Aberdare.

E. nemorosa H. Mart. 5. Aberafan. 6. Porthcawl to S. Cornely. 8. Aberdare, Ystradowen.

E. brevipila Burn et Grem. 1. Penmaen, Llangenydd. 5. Margam Burrows, *Hb. Br. Mus.* Port Talbot, Aberafan to Baglan. 7. Barry Island. 8. Aberdare. 9. Caerphilly.

E. scottica Wettst. 8. Aberdare, apparently this.

E. curta Fr., var. *glabrescens* Wettst. 1. Rhosili, Oxwich, Llangenydd. 5. Aberafan, Kenfig Pool. 6. Porthcawl. 7. Llantwit Major to Monknash. 8. Welsh St. Donat's.

E. occidentalis Wettst. 7. Barry Island; name agreed to with some doubt by *E. S. M.*

Bartsia Odontites Huds. Aggregate from every district except 2 and 9.—Var. *verna* (Reichb.). 1. Rhosili to Llangenydd. 6. S. Cornely.—Var. *serotina* (Reichb.). 1. Llangenydd, Cheriton, Reynoldstone to Paviland, Port Eynon to Oxwich. 2. Gowerton, Pontardulais to Pantyffynon. 5. Port Talbot. 6. Newton sands, Porthcawl. 7. St. Athan's Road to Llantwit Major, Barry to Bonvilstone. 8. Aberdare, Hirwaun.

B. viscosa L. 3. Drymma, Crumlin Dingle, &c., *Gutch.* 5. Aberafan and Baglan. 6. Near Bridgend, *Storrie.*

Pedicularis palustris L. 1. Fairly frequent. 2. Penllergaer, *Gutch.* 3. Crumlin Burrows. 4. Jersey Marine, Neddfechan Glen. 6. Porthcawl, *Lloyd.* 7. Barry, *D.* 8. St. George's, near Culver House, St-y-Nyll, &c., *Storrie.* Tylacoch, Mardy, &c., *Rhondda Fl.* Hirwaun.

P. sylvatica L. Frequent; no records from 5 and 6.

Rhinanthus Crista-galli L. Frequent. Apparently all *R. minor* Ehrh.

Melampyrum pratense L. Aggregate frequent. Type from 1. Gowerton. 2. Loughor, Mynydd Garngoch, Gorseinon. 4. Glyn Neath, Resolven, Melincourt Glen, Neddfechan Glen. 5. Margam, *Hb. Motley.* 6. Merthyr Mawr. 7. Barry. 8. Forest Wood, Ystradowen, Garth Wood. 9. Pwllypant, *Hb. Cardiff.* Caerphilly. — Var. *hians* Druce. 2. Pantyffynon to Pontardulais. 4. Upper Neath Valley. 8. Common at Aberdare, Hirwaun, Mountain Ash, &c. — Var. *montanum* Johnst. 4. Rhigos, hills above R. Perddyn.

Orobanchaceæ.

Orobanche major L. 1. Penmaen, *Swansea Sci. Soc. Proc.* 1893. 3. Swansea, *Gutch.* 7. Cowbridge, *W. F. Evans.* Near Cadoxton Mill and M. Dyfan Church, *Cardiff Nat. Soc. Proc.* 1891–2. 8. St. Fagan's Castle, *Cardiff Nat. Soc. Proc.* 1882.

(*O. rubra* Sm. Gutch gives a hesitating record, with no locality.)

(*O. caryophyllacea* Sm. 1. Gower, *Lloyd.*)

O. elatior Sutton. 1. Penrice, &c., *Gutch.* 5. Port Talbot. 7. Cwrtyrala, *Storrie.*

O. Hederæ Duby. 1. Common. 4. Briton Ferry, *Flower.* 6. S. Cornely. 7. Cliffs near Llantwit Major. Sully, *Woods.* Barry, *D.*

**O. minor* Sm. 1. Llangenydd. 6. Porthcawl Sands, Tythegston.

**Lathræa Squamaria* L. 4. Pontneddfechan and Neddfechan Glen, *N. F. Sheppard.* 8. Cardiff, Coed-y-Mwstwr, Llangrallo, &c., *Storrie.* Whitchurch, *Miss F. M. Williams.*

Lentibularieæ.

Utricularia vulgaris L. 1. Oystermouth, and 3. Crumlin Bog, and 4. Neath, *Flower & Lees.* 8. About Cardiff, *Storrie.*

**U. neglecta* Lehm. 8. Grangetown, *Hb. Cardiff*!

U. minor L. 3. Llandwr Marsh, *Gutch.* Crumlin Bog, *Hb. York Mus.* 4. Llynfach, *Storrie.*

Pinguicula vulgaris L. 1. Gower, *Swansea Sci. Soc. Proc.* 1895–6. 3. Ystalyfera. 4. Craig-y-llyn, hills above R. Perddyn and in the Glen, Melincourt Glen. 5. Glyncorrwg, *Hb. Motley.* 6. Llynfi Valley, near Llangynwyd, &c., *Storrie.* 8. Cwmparc, Graig Fawr, Aberdare, scarce. Hirwaun, *Miss F. M. Williams.* St. Fagan's, *Storrie.* Between Treherbert and Rhigos, *Cardiff*

Nat. Soc. Proc. 1891–2. Pontrhondda, Mardy, Clydach Vale, &c., *Rhondda Fl.*

(*P. lusitanica* L. 6. Llangynwyd, *Storrie.*)

Verbenaceæ.

Verbena officinalis L. 1. Common. 3. Swansea, *Gutch.* Ystalyfera. 4. Neath, *W. M. R.* 5. Port Talbot, Mawdlam. 6. S. Cornely. 7. Cadoxton to Bonvilstone, Aberthaw, Aberthin. Sully, *Storrie.* 8. Aberdare, Cardiff, Peterston, Ystradowen.

Labiatæ.

Mentha rotundifolia L. 1. Penrice, *Flower.* Penard, *G. C. D.* 2. Pontardulais, *Dillwyn.* 3. Singleton, *Gutch.* 4. Briton Ferry, *Flower.* Neath, *Hb. York Mus.* 5. Kenfig, *Hb. Motley.* 6. Pencoed, *Storrie.* 7. St. Donat's, &c., *Lightf.* 8. Taffs Well. St. Fagan's, *Storrie.* Pontrhondda, Blaenycwm, &c., *Rhondda Fl.* 9. Caerphilly.

M. longifolia Huds. 2. Pontardulais. 4. Glyn Neath, *J. Bot.* 1892, p. 297. 6. Porthcawl, *Lloyd.* Pencoed, *Storrie.* 7. Cowbridge, *Lightf.* 8. Aberdare, Peterston. Cardiff, *Hb. Watson.*

M. piperita L. 1. Quoity Green. 2. Pontardulais. 3. Swansea, *B. G.* Ystalyfera. 5. Kenfig, *Hb. Motley.* 6. Monknash. Porthcawl, *J. Bot.* 1902, p. 317. 7. Aberthin, Ystradowen, Llandough. 8. St. Fagan's, *Storrie.* Peterston, Taffs Well, Hirwaun. Most of these refer to var. *officinalis* (Hull.).—Var. *vulgaris* (Sole). 1. Oxwich. 8. Aberdare.

M. hirsuta Huds. Fairly well distributed; hardly common.

M. sativa L. *a rivalis* Lond. Cat. 1. Parkmill, Oxwich Burrows, Killay, Burry Green, Whitford Burrows. 8. Aberdare, Hirwaun. —*β paludosa* (Sole). 4. Perddyn Glen, *Ley.* 5. Port Talbot. 8. Aberdare, Hirwaun.

**M. rubra* Sm. 8. River below and road above Hirwaun.

M. arvensis L. 1. Rather frequent. 3. Crumlin Bog and Kilvey Hill, *Gutch.* 4. Glyn Neath, Pontwhalby. Briton Ferry and Neath Canal, *Flower & Lees.* 6. Porthcawl, *Lloyd.* 7 and 8. Frequent. — Var. *agrestis* (Sole). 8. Aberdare. — Var. *parietariæfolia* (Beck). 8. Aberdare.

M. Pulegium L. 1. Reynoldstone. 5. Pyle, *Dillwyn.* 6. Cornely, *Hb. Motley.* Pencoed, Penprisc, &c., *Storrie.* Nottage, *E. S. M.* 8. E. Moors, Cardiff, *Hb. Cardiff.*

Lycopus europæus L. 1. Hollows of sand-hills, Oxwich and Whitford Burrows. Killay to Penard, *G. C. D.* 2. Penllergaer. 3. Crumlin Bog. 4. Neath. 5. Margam Moors, Port Talbot, &c. 6. Porthcawl, Merthyr Mawr. Llynfi and Garw Valleys, *Storrie.* 8. Aberdare to Penrhiwceiber, Welsh St. Donat's, Taffs Well, Peterston. Rhondda Valleys, common, *Rhondda Fl.* 9. Caerphilly, &c. Roath.

Origanum vulgare L. 1. Frequent. 3. Swansea, *Gutch.* 4. Neath Abbey, *W. M. R.* 5. Pyle. 6. Frequent. 7. Porthkerry. Barry, *D.* St. Athan's, *Storrie.* Flat Holme, *J. Bot.* 1891, p. 345.

Monknash, Llandough. 8. Aberdare, Taffs Well, Ystradowen. Morlais Castle, *B. A. Williams.*

Thymus Serpyllum Fr. 1, 4, 8. Common. 3. Swansea, *Gutch.* Ystalyfera. 6. Porthcawl Sands to S. Cornely. 7. Cowbridge, Barry and island. Flat Holme, *J. Bot.* 1891, p. 345. 9. Caerphilly. Llanishen, &c., *Storrie.*

T. Chamædrys Fr. 1. Mumbles, *Hb. Cardiff.* Oxwich to Port Eynon, Rhosili. 6. Cornely, *Hb. Motley.* 7. Barry Island.

Clinopodium vulgare L. 1. Langland Bay, *W. M. R.* Caswell Bay, Oxwich, Parkmill, Frog Moor. 3. Swansea, *Gutch.* 5. Mawdlam, &c., Port Talbot. 6 and 7. Frequent. 8. Aberdare, Ystradowen, Penarth. St. Fagan's, &c., *Storrie.* Bodringallt, Cymmer, &c., *Rhondda Fl.* 9. Caerphilly, Cefn On, Ruperra.

C. Acinos O. Kuntze. 1. Pwlldu to Penard, Worms Head, Port Eynon. 3. Swansea, *Gutch.* 5. Aberafan Burrows. 6. Porthcawl, *Lloyd.* 7. Barry, *D.*

(*C. Nepeta* O. Kuntze. *E. S. M.* thinks there is some mistake in the record of *Top. Bot. Supp.* 1905. 9. Caerphilly, *Woods.*)

C. Calamintha O. Kuntze. 1. Penmaen. 3. Singleton, *Gutch.* 6. S. Cornely, Ewenny. 7. Barry Island, *Cardiff Nat. Soc. Proc.* 1891–2. Swanbridge, Sully.

Salvia Verbenaca L. 1. Port Eynon, Oxwich, &c. Paviland, *Swansea Sci. Soc. Proc.* 1892–3. 4. Vernon Park, *Nicholson.* 5. Aberafan, Port Talbot. 6. Porthcawl, Merthyr Mawr, S. Cornely. 7. Barry, *Storrie.* 8. Cardiff, Penarth, *Storrie.*—Var. *clandestina* auct. angl. 8. Aberdare.

**Nepeta Cataria* L. 1. Oxwich to Worms Head, Broughton Bay, Llangenydd Burrows, Llanmadoc. 5. Kenfig and Mawdlam. 6. Southerndown. Newton Nottage, *Cardiff Nat. Soc. Proc.* 1891–2. 7. Barry, *D.* Monknash, The Leys. 8. Aberdare. Pentyrch. 9. Caerphilly, *Woods.* Native in 1, 6, 7.

N. hederacea Trevis. Common. Form with small pistillate flowers at 8. Morlais Castle = var. *parviflora* Benth.

Scutellaria galericulata L. Fairly common; no record for 7.

S. minor Huds. 1. Fairwood Common, Cefn Bryn. 2. Loughor Down, *Hb. Motley.* Penllergaer. 3. Frequent, *Flower.* 4. Neath Valley, *Gutch.* Llynfach. 6. Llangynwyd, &c., *Storrie.* 8. Fairly common. 9. Llanishen, *D.* Cardiff, Rhymney Valley, &c., *Storrie.*

Prunella vulgaris L. Common.

**Marrubium vulgare* L. 1. Penard to Llanmadoc; native. 5, 6. Frequent near the sea. 7. Barry, *D.* St. Hilary, *Storrie.* 8. Cardiff Docks, Aberdare. Ely, St. Fagan's, &c., *Storrie.*

Stachys officinalis Franch. Common; no records for 3 and 5.

S. palustris L. Common. — × *sylvatica* (= **ambigua* Sm.). 1. Nicholaston. 3. Kilvey Hill, *Gutch.* 4. Neath, *W. M. R.* 9. Caerphilly.

S. sylvatica L. Common.

S. arvensis L. 1. Frequent. 2. Gowerton. 3. Mumbles Road, *Gutch.* Kilvey Hill, *Hb. Bicheno.* 5. Graigafan, *Hb. Motley.* Mawdlam. 6. Porthcawl, *Lloyd.* 7. Llantwit Major to St. Donat's, Aberthin to Ystradowen, St. Athan's. 8. Aberdare. Bodringallt,

Rhondda Fl. Penarth, *Storrie.* 9. Penylan, Llanishen, &c., *Storrie.*

Galeopsis angustifolia Ehrh. 1. Pwlldu. 3. Swansea, *Gutch.* 5. Kenfig, *Hb. Motley.* 6. Porthcawl, *Lloyd.* Pencoed, *Storrie.* 7. Aberthaw, The Leys. Near Llantwit Major, *D.* Sully. Bonvilstone, &c., *Storrie.* 8. Penarth, *Storrie.*

G. speciosa Mill. 1. Gowerton to Penclawdd, *J. Bot.* 1892, p. 316. 8. Aberdare, &c., *Storrie.*

G. Tetrahit L. 1. Paviland, Horton. 3. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. Ystalyfera. Swansea, *Gutch.* 5. Port Talbot. 6. Porthcawl, *Lloyd.* 7. St. Athan's. 8. Aberdare Valley, frequent; Ystradowen, Peterston Moor. — Var. *bifida* (Bœnn.). 8. Aberdare, Welsh St. Donat's, Peterston. Merthyr Vale, *Hb. Cardiff.*

Lamium amplexicaule L. 1. Gower, *Hb. Cardiff.* 5. Mawdlam. 6. Porthcawl to S. Cornely. 7. Dinas Powys. St. Athan's, *Storrie.* 8. Penarth, *Storrie.* Pantyreisteddfa, *Rhondda Fl.*

(*L. moluccellifolium* Fr. (*intermedium* Fr.). 8. Llandaff and Pontypridd, and 9. Caerphilly, *Storrie.*)

L. hybridum Vill. 1. Frequent. 3. Swansea, *Dillwyn.* 5. Kenfig, Margam, Port Talbot. 6. Porthcawl to S. Cornely. 7. Cog. Barry Mill, *Storrie.* 8. Penarth Ferry, *Storrie.*

L. purpureum L. Fairly frequent; no records from 2 and 4.— Var. *decipiens* Sonder. 1. Oxwich, Rhosili, Llangenydd. Gowerton to Penclawdd, *J. Bot.* 1892, p. 297. 4. Glyn Neath. 7. Marcross, Ystradowen. 8. Llwydcoed.

L. album L. All districts; doubtfully native, except perhaps 7. Cliffs at Swanbridge.

L. Galeobdolon Crantz. 2. Penllergaer, *Gutch.* Pantyffynon to Pontardulais. 3. Ystalyfera. 4. Upper Neath Valley, frequent. 5. Graigafan, *Hb. Motley.* 6. S. Cornely. 7. Wenvoe. Dinas Powys, *Storrie.* 8, 9. Frequent.

Ballota nigra L. 1. Llangenydd. 3. Swansea, *Gutch.* 5, 6, 7, 8. Rather frequent.

Teucrium Scorodonia L. Very common.

Ajuga reptans L. Frequent.

Plantagineæ.

Plantago major L. Very common. — Var. *intermedia* (Gilib.). 1. Killay to Penard, *G. C. D.* 3. Crumlin Burrows. 5. Port Talbot, Kenfig. 6. S. Cornely. 7. Cowbridge. 8. Aberdare. 9. Roath.

P. media L. 1. Penmaen, *Swansea Sci. Soc. Proc.* 1893. Swansea, *Gutch.* 6, 7. Frequent. 8. Aberdare, Ystradowen, Penarth, Lavernock, Leckwith. Penrhys, &c., *Rhondda Fl.* 9. Craig Llanishen.

P. lanceolata L. Very common. — Var. *sphærostachya* Röhl. 3. Ystalyfera. 6. Ewenny Down.—Var. *Timbali* Reichb. fil. 3. Swansea. 7. Cadoxton. 8. Cardiff. 9. Roath.

P. maritima L. On the coast in all districts.

P. Coronopus L. On the coast, common. Also 6. S. Cornely.

9. Caerphilly.—Var. *ceratophyllum* Rap. 7. Nash Point.—Var. *pygmæa* Lange. 1. Rhosili. 6. Porthcawl.

Littorella uniflora Asch. 1. Penard Burrows, Cefn Bryn. 4. Llyn fawr, *Storrie*. 5. Kenfig Pool. 8. Welsh St. Donat's, Hirwaun Ponds.

Chenopodiaceæ.

**Chenopodium Vulvaria* L. 5. Port Talbot. 7. Near Sully Island, *Storrie*.

C. album L. Not very frequent.—*α incanum* Moq. 1. Oxwich. Langland Bay, *W. M. R.* 5. Port Talbot, Mawdlam. 7. Boverton to St. Donat's. 8. Aberdare.—*β viride* Syme. 3. Singleton, *Gutch*. 5. Port Talbot. 8. Aberdare. — *γ viridescens* St. Am. 5. Port Talbot. 7. Barry Island. 8. Aberdare.—Var. *leptophyllum* Nutt. 5. Port Talbot. 8. Cardiff.

C. rubrum L. 3. Singleton, *Gutch*. 5. Port Talbot. 6. Porthcawl, Ogmore Estuary. 8. Aberdare, Cardiff. Tylacoch, *Rhondda Fl.* — f. *pseudobotryoides* H. C. Wats. 5. Kenfig Pool, *Hb. Motley*. 6. Ogmore Estuary.

C. Bonus-Henricus L. 1. Worms Head, *Gutch*. 3. Ystalyfera. 4. Neath, *Gutch*. 5. Kenfig, *Hb. Motley*. 6. Bridgend, &c. Porthcawl, *Lloyd*. 7. St. Athan's. 8. Aberdare and Hirwaun, Welsh St. Donat's, Taffs Well.

Beta maritima L. 1. Frequent. 3. Swansea, *Hb. Motley*. 4. Neath, *W. M. R.* 5. Port Talbot. 6. Porthcawl. 7. Frequent. 8. Cardiff and Penarth.

Atriplex littoralis L. 3. Swansea, *Westcombe*. 5. Port Talbot. 7. Barry, Aberthaw, &c., *Storrie*. 8. Cardiff. Penarth, &c., *Storrie*. —Var. *serrata* Moq. 5. Port Talbot. 8. Cardiff.

A. patula L. 1. Worms Head, *Hb. Motley*. 3. Swansea Ferry to Port Tennant, *Gutch*. 4. Neath, *W. M. R.* 8. Aberdare. Cardiff, &c., *Storrie*.—Var. *erecta* Huds. 5. Port Talbot. 6. S. Cornely. 7. M. Dyfan. 8. Aberdare, Cardiff. — Var. *angustifolia* (Sm.). 1. Langland Bay, *W. M. R.* Killay to Penard, *G. C. D.* 3. Singleton and Kilvey Hill, *Gutch*. 4. Neath, *W. M. R.* 5. Port Talbot. 8. Cardiff, Aberdare.

A. hastata L. 1. Langland Bay, *W. M. R.* 5. Port Talbot. 6. Ogmore Estuary. 8. Cardiff, Aberdare.

**A. deltoidea* Bab. 3. Near Crumlin Bog. 4. Neath. 5. Port Talbot. 8. Aberdare, Cardiff.—Var. *prostrata* Bab. 5. Port Talbot. 8. Cardiff.

A. Babingtonii Woods. 1. Oxwich, Penclawdd, marsh near Whitford Burrows. 5. Port Talbot. 6. Ogmore Estuary. Porthcawl, *J. Bot.* 1902, p. 317. 7. Sully and Barry Islands, *Woods*. Aberthaw, &c., *Storrie*. 8. Cardiff, Grangetown.

**A. laciniata* L. 1. Langland Bay, *W. M. R.* Penclawdd. 3. Crumlin Burrows. 4. Jersey Marine. 5. Port Talbot. 6. Porthcawl. 8. Ballast, Cardiff, *Storrie*.

Obione portulacoides Moq. 1. Salthouse Point, Gowerton, Whitford Burrows. Penard, *Gutch*. Rhosili, *D*. 2. Loughor. 3. Crumlin Bog, *Gutch*. 5. Port Talbot and Aberafan. 7. Aberthaw and The Leys. 8. Penarth Ferry, &c., *Storrie*.

Salicornia europæa L. 1. Penclawdd, Whitford Point, Oxwich Bay, Three Cliffs Bay. 2. Loughor. 4. Neath Canal, *Gutch.* 5. Port Talbot. 6. Merthyr Mawr. 7. The Leys and Aberthaw. Barry, *Storrie.* 8. Ely, Penarth, &c., *Storrie.*—Var. *pusilla* Woods. 1. Penclawdd, Llanmadoc. 5. Port Talbot.—Var. *stricta* Dum. 5. Port Talbot.—Var. *procumbens* Sm. 1. Oxwich, *Hb. Watson.*—Var. *ramosissima* Woods. 1. Three Cliffs Bay, Llanmadoc, Penclawdd: and ? *ramosissima* × *stricta.* 1. Three Cliffs Bay; name suggested by E. S. M.—Var. *intermedia* Woods. 1. Apparently this at Llanmadoc.

**S. appressa* Dum. 1. Three Cliffs Bay, Llanmadoc. 5. Port Talbot.

(*S. radicans* Sm. 3. Swansea, *B. G.* 7. Barry, *Storrie.*)

(*Suæda fruticosa* Forsk. 3. Port Tennant, *Gutch.* 7. Flat Holme, *Ray, Cat.* 8. Cogan Pill, *Storrie.*)

S. maritima Dum. Common; no record for 9.—Var. *procumbens* Syme. 1. Whitford Point, Penclawdd, Three Cliffs Bay. 7. St. Athan's Road.

Salsola Kali L. Frequent in 1, 3, 4, 5, 6, 7, 8.

Polygonaceæ.

Polygonum Convolvulus L. 1. Gowerton, Port Eynon, Oxwich. Langland Bay, *W. M. R.* 3. Swansea, *Gutch.* Ystalyfera. 4. Neath, *W. M. R.* 5. Graigafan, *Hb. Motley.* Port Talbot. 6. Porthcawl, Bridgend. 7. Cadoxton, Llantwit Major to St. Donat's. 8. Aberdare, Pentyrch, Peterston. Bodringallt, *Rhondda Fl.*—Var. *subalatum* V. Hall. 1. Oxwich. Langland Bay, *W. M. R.* 5. Port Talbot. 7. Barry. 8. Aberdare.

P. aviculare L. Common.—Var. *agrestinum* (Jord.). 1. Burry Green. Caswell and Langland Bays, *W. M. R.* 4. Neath, *W. M. R.* 5. Port Talbot. 6. Porthcawl to S. Cornely. 8. Cardiff, Hirwaun. 9. Pengam Marshes.—Var. *vulgatum* Syme. 1. Oxwich. 5. Port Talbot. 6. Bridgend. 7. Cadoxton, Barry, Llantwit Major to Monknash. 8. Cardiff, Aberdare.—Var. *arenastrum* (Bor.). 5. Port Talbot. 7. Cadoxton. 8. Cardiff, Aberdare, Hirwaun.—Var. *microspermum* (Jord.). 5. Port Talbot. 8. Aberdare.—Var. *rurivagum* (Jord.). 5. Port Talbot. 8. Cardiff.—Var. *littorale* (Link.). 5. Port Talbot. 8. Aberdare, Cardiff.

P. Roberti Lois. 3. Swansea, *Hb. Watson.* 4. Neath, *Flower.* (8. All along the coast, *Storrie.*)

(*P. maritimum* L. 8. Cardiff and Penarth, *Storrie.*)

P. Hydropiper L. Common; no record for 4.

**P. minus* Huds. 3. Swansea, *Gutch.* 5. Port Talbot.

(*P. mite* Schrank. 3. Swansea, and 4. Neath, *Flower & Lees.*)

P. Persicaria L. Common.—f. *incana.* 5. Port Talbot. 7. Ystradowen. 8. Aberdare, Cardiff.—Var. *elatum* Gren. & Godr. 3. Ystalyfera. 4. By Neath Canal, *W. M. R.* 6. Porthcawl. 8. Aberdare.

P. lapathifolium L. 1. Langland Bay, *W. M. R.* Gowerton. 2. Loughor. 3. Swansea, *Gutch.* 4. Neath Abbey, *W. M. R.* 5. Port Talbot. 6. Porthcawl, Tythegston. 8. Aberdare. Car-

diff, *Storrie*. Penrhys Farm, *Rhondda Fl.* — f. *incana*. 2. Near Gorseinon.

**P. maculatum* Bab. 5. Port Talbot. 8. Aberdare, native. Cardiff Docks.

P. amphibium L. Rather common. — Var. *terrestre* Leers. 1. Broughton Sands. 3. Crumlin Burrows. 5. Margam Marshes. 7. Llantwit Major. 8. Cardiff, Welsh St. Donat's.

P. Bistorta L. 1. Penrice, native. 2. Pantyffynon. Gorseinon, *Swansea Sci. Soc. Proc.* 1895–6. 3. Swansea, *Flower*. 4. Aberpergwm. 6. Bridgend to Pyle, Ogmore Castle. Pencoed to Llantrissant, *J. Bot.* 1902, p. 250. 8. Penrhys, *B. A. Williams*. About Aberdare, Penydaren. Greenmeadow, St. Fagan's, &c., *Storrie*. Mostly introduced.

Rumex conglomeratus Murr. Rather frequent; no record for 4.

R. sanguineus L. 4. Neath, *W. M. R.* 7. Barry, Aberthaw, M. Dyfan, &c., and 8. Penarth, *Storrie*. — Var. *viridis* (Sibth.). Very frequent.

**R. maritimus* L. (1. Port Eynon, *Dillwyn*.) 7. Barry, ballast, *Cardiff Nat. Soc. Proc.* 1891–2. 8. Cardiff, native.

**R. pulcher* L. 2. Loughor, *Hb. Motley*. 5. Port Talbot. 6. Porthcawl. 8. Cardiff, *Storrie*.

R. obtusifolius L. Common.

R. crispus L. Common.—Var. *trigranulatus* Syme. 1. Salthouse Point, Whitford Point. Llanmorlais, *J. Bot.* 1892, p. 297. 4. Jersey Marine. 5. Aberafan and Port Talbot. 6. Porthcawl to Sker. 7. Cold Knap, The Leys, Llantwit Major, St. Donat's. 8. Cardiff Docks.— × *obtusifolius* (= *R. acutus* L.). 2. Pontardulais. 5. Graigafan, *Hb. Motley*. 7. Cowbridge.

R. Hydrolapathum Huds. 1. Oxwich, Parkmill, Rhosili, Llangenydd. 3. Crumlin Bog. 4. Jersey Marine, Aberdylais. Neath Abbey, *W. M. R.* 5. Margam to Aberafan Moors. 8. St. Fagan's, *Cardiff Nat. Soc. Proc.* 1891–2.

R. Acetosa L. Common.

R. Acetosella L. Fairly common.

Thymelæaceæ.

**Daphne Laureola* L. 6. Merthyr Mawr. 7. Lavernock. Dinas Powys, *D.* Porthkerry, Gigman Bridge, Llantwit Major, &c., *Storrie*. 8. Penarth, *Storrie*.

Loranthaceæ.

Viscum album L. 8. Cardiff to Llantrissant, *Bot. Rec. Club Rep.* 1873. Crockherbtown, St. Fagan's, &c., *Storrie*.

Euphorbiaceæ.

Euphorbia Peplis L. 6. Porthcawl, extinct, *Phyt.* ii. 972.

E. Helioscopia L. Fairly frequent; no record for 9.

(*E. platyphyllos* L. 8. Lavernock, *Storrie*.)

(*E. stricta* L. 8. Penarth, *Storrie*.)

E. amygdaloides L. 1. Oxwich and Nicholaston Woods, Parkmill. 3. Swansea, *Flower & Lees*. 5. Port Talbot. 7. Llandough.

Dinas Powys, *D.* 8. Taffs Well, Ystradowen. Cogan, Llandaff, &c., *Storrie.*

E. Paralias L. Frequent on the sandy coast. No record from 2 and 9.—× *portlandica.* 5. An intermediate plant, growing with both species on Margam Moors, was apparently this.

E. portlandica L. 1. Very common, Mumbles to Whitford Point. 5. Port Talbot, Margam and Kenfig Sands. 6. Porthcawl.

E. Peplus L. Fairly frequent.

E. exigua L. 1. Llanmadoc. Langland Bay, *W. M. R.* 3. Sketty, *Gutch.* 5. Port Talbot. 6. Porthcawl to S. Cornely. 7. Barry, Wenvoe, Porthkerry, Boverton to St. Donat's. 8. Cardiff, Penarth, Llandaff, &c., *Storrie.*

**E. Lathyrus* L. 1. Nicholaston Woods ; native, I believe.

Mercurialis perennis L. Common.

Urticaceæ.

Ulmus glabra Huds. Common ; no record for 9. Native in the hills.—Var. *nitida* Syme. 4. Glyn Neath. 8. Aberdare, and often planted.

**U. campestris* L. Uncommon in the hills ; more frequent in the lowlands. No record for 2.

Humulus Lupulus L. 1. Frequent. 2. Pantyffynon, Loughor. 4. Glyn Neath, Resolven, Neath. 5. Port Talbot. 6. Ewenny, near Ogmore Castle. 7. Barry, *D.* Marcross, St. Athan's, Ystradowen, Stalling Down. 8. Aberdare, Mountain Ash, Welsh St. Donat's, Taffs Well. Cardiff, Llandaff, Penarth, St. Fagan's, &c., *Storrie.* 9. Llanishen, Rudry.

Urtica dioica L. Common.—Var. *angustifolia* A. Blytt. 7. Near Laleston.

U. urens L. 1. Common; native on the burrows. Less common in 3 to 8. No record for 2 and 9.

Parietaria ramiflora Moench. Common. No record for 2.—Var. *fallax* Gren. et Godr. 5. Port Talbot. 7. Merthyr Dyfan. 8. Cardiff.

Myricaceæ.

Myrica Gale L. 1. Rhosili Down. 2. Pontardulais. 3. Crumlin Bog. 6. Bridgend, Llangynwyd, *Storrie.* 9. Llanishen, *Storrie.*

Cupuliferæ.

**Betula pendula* Roth. 1. Penclawdd to Llanmadoc. 2. Pontardulais to Pantyffynon. 3. Llansamlet to Swansea and Killay, Ystalyfera, Crumlin Bog. 4. Frequent. 6. Merthyr Mawr. 8. Aberdare, Taffs Well, Garth Wood, Pentyrch, Rhondda Valley.

B. alba L. 1. Killay to Penard, *G. C. D.* 2. Pontardulais to Pantyffynon. 3. Swansea, *J. Bot.* 1890, p. 157. 4. Glyn Neath, Rhigos, Perddyn Gorge. 5. Glyn Corwg, *Storrie.* 8. Aberdare, Taffs Well, Garth Wood, Pentyrch. 9. Cefn On.

Alnus rotundifolia Mill. Common.

Corylus Avellana L. Common.

Quercus Robur L. Common in one form or another.

Q. pedunculata (Ehrh.). 1. Killay to Penard, *G. C. D.* 4. Glyn

Neath. 5. Margam, *B. A. H.* 8. Peterston, Aberdare, and frequently.

Q. intermedia D. Don. 8. Aberdare.

Q. sessiliflora Salisb. 1. Oxwich. 3. Kilvey Hill, *Gutch.* 6. Bridgend. 7. Barry. 8. Aberdare, Porth. 9. Llanedan, Roath.

Fagus sylvatica L. Frequent; often planted. No record for 3 and 5.

Salicineæ.

Salix triandra L. 3. Swansea, *Gutch.* 5. Stream between Pyle and Port Talbot, *J. Bot.* 1902, p. 250. 7. Cowbridge. 8. Aberdare.—Var. *Hoffmanniana* Sm. 5. Kenfig Pool, *Hb. Motley.*—× *viminalis* (= *S. hippophaefolia* Wimm. & Grab.). 5. Stream between Pyle and Port Talbot, *J. Bot.* 1902, p. 250.

S. fragilis L. var. *britannica* F. B. White. Frequent.—× *triandra* (= *S. decipiens* Hoffm.). 8. Aberdare.

**S. alba* L. 1. Killay to Penard, *G. C. D.* Llanmorlais, *J. Bot.* 1892, p. 297. 2. Loughor, *Hb. Motley.* Pantyffynon. 3. Crumlin Bog. 5. Margam Moors. 7. Aberthin. 8. Aberdare, Taffs Well, Peterston. Bodringallt Woods, &c., *Rhondda Fl.*—Var. *vitellina* L. 3. Swansea, *Gutch.* 8. Aberdare. — × *fragilis* (= *S. viridis* Fr.). 8. Aberdare.

S. cinerea L. Very common.— × *nigricans.* 8. Aberdare.

S. aurita L. Common; no record for 6 and 7.— × *Caprea* (= *S. capreola* J. Kern.). 8. Aberdare.— × *cinerea* (= *S. lutescens* A. Kern.). 1. Rhosili. 5. Graigafan, *Hb. Motley.* 8. Aberdare.

**S. Caprea* L. Common.— × *cinerea* (= *S. Reichardti* A. Kern.). 8. Aberdare.

S. repens L. Common, especially on the sea-sands. — Var. *prostrata* Sm. 3. Swansea, *Rep. B. E. C.* 1886.—Var. *parvifolia* Sm. 3. Swansea, *Rep. B. E. C.* 1892.—f. *ascendens* (Sm.). 3. Crumlin Burrows, *Dillwyn.*—Var. *incubacea* Syme. 8. Aberdare.

**S. viminalis* L. Common.

S. Smithiana Willd. 1. Penard Castle, *N. B. G.* 3 and 4. Crumlin Bog. 5. Port Talbot, Margam Moors, Mawdlam to S. Cornely. 7. Cowbridge. 8. Aberdare, Morlais Castle, Peterston, Taffs Well.

S. stipularis Sm. 3. Crumlin Burrows, *J. Bot.* 1886, p. 376. 5. Margam Moors. 8. Peterston, Aberdare.

**S. purpurea* L. 8. Aberdare. — × *viminalis* (= *S. rubra* L.). 8. Aberdare, Leckwith Wood. — × *cinerea* (= *S. sordida* Kern.). 8. Taffs Well.

Populus tremula L. 3. Swansea, *Gutch.* Glanrhyd, *Swansea Sci. Soc. Proc.* 1893. 4. Craig-y-llyn, Neath, Perddyn Gorge. 7. Wenvoe. Sully, *Storrie.* 8. Aberdare, Mountain Ash, Peterston Moor. Penarth, Llandaff, &c., *Storrie.* All var. *villosa* (Lange), I believe.

Empetraceæ.

Empetrum nigrum L. 4. Hills above Pontneddfechan, *Dillwyn.* 7. St. Lythan's Down, *Nicholson.* 8. Hills between Aberdare and Merthyr.

Coniferæ.

Juniperus communis L. 1. Pwlldu, Horton, Nicholaston Woods, &c. 7. Barry Island, *Storrie*. 8. Hirwaun Common, *Storrie*.

Taxus baccata L. 1. Parkmill, *G. C. D*. 3. Swansea, *Gutch*. 5. Margam, *Hb. Motley*. Glyncorwg, *Brit. Ass. Handb*. 7. Wenvoe, Marcross, Cadoxton. St. Andrews, *Storrie*. Porthkerry. 8. Cardiff, *J. Bot*. 1884, p. 257. Aberdare. 9. Llanishen, *Brit. Ass. Handb*. Usually planted.

**Pinus sylvestris* L. Largely planted, but, I think, native on the hills 8. above Aberdare.

Hydrocharideæ.

**Hydrocharis Morsus-ranæ* L. 3. Crumlin Bog, *Lightf*. 5. Margam Marshes, scarce, Port Talbot. 8. Grangetown. Cardiff, *Storrie*.

Orchideæ.

**Liparis Loeselii* Rich., var. *ovata*, Riddelsdell. One spot only in the county; see *J. Bot*. 1905, p. 274.

Neottia Nidus-avis Rich. 1. Penrice, *B. G*. 3. Pontardawe, *Flower*. 4. Pontneddfechan, *Hb. Brit. Mus*. 5. Margam Woods, *B. G*. 6. Coytrahen, *Storrie*. 7. Wenvoe, *Storrie*. Barry, *D*. Porthkerry and Cwrtyrala, *Cardiff Nat. Soc. Proc*. 1891–2. 8. Garth Wood, &c. St. Fagan's, near Castell Coch, *Storrie*.

Listera ovata Br. Frequent.

Spiranthes spiralis C. Koch. 1. Oxwich, *Miss F. M. Williams*. Mumbles, *Flower*. Caswell Bay and Langland Bay, *W. M. R*. 3. Swansea, *Flower*. 5. Pyle, *Hb. Motley*. 6. Bridgend, *Cardiff Nat. Soc. Proc*. 1882. Porthcawl, *J. Bot*. 1902, p. 317. Pencoed, *Storrie*. 7. Barry, *D*. Sully, *Storrie*. 8. Cardiff, *Storrie*. 9. Llanishen, *Storrie*.

Epipactis Helleborine Crantz. 1. Nicholaston Woods. 4. Glyn Neath. Resolven, *W. M. R*. Perddyn and Neddfechan Gorges. 5. Aberafan and Kenfig Pool, *Whitehouse*. 6. Pencoed, *Storrie*. 7. Swanbridge, Cowbridge, *Storrie*. Dinas Powys, *D*. Wenvoe. 8. Aberdare. Hirwaun, *B. A. Williams*. Taffs Well. 9. Rudry, Craig Llanishen.

E. longifolia All. 1. Coast, frequent. 5. Coast, Kenfig to Aberafan. 6. Porthcawl Sands. Bridgend, *Storrie*. 7. Barry, *D*. 8. Ystradowen Moor. Culverhouse, St. Fagan's, *Hb. Cardiff*. 9. Lisvane. Llanishen, *Storrie*.

**Orchis pyramidalis* L. 6. Monknash. 7. Sully, Barry Island.

O. Morio L. 3. Swansea, *Hb. Geldart*. 5. Aberafan, *Whitehouse*. 7. Barry Island. Beaupré, *W. F. Evans*. 8. Aberdare. St. Fagan's, Penarth, *Cardiff Nat. Soc. Proc*. 1891–2.

**O. mascula* L. 1. Rhosili, Burry Green, Llanmadoc, Whitford Burrows, Parkmill. 6. Porthcawl, *Lloyd*. 7. Sully Island. Lavernock, *Storrie*. Dinas Powys, *D*. 8. Aberdare, Taffs Well. Cogan, Penarth, *Storrie*. Blaenrhondda, Penrhys, *Rhondda Fl*. 9. Coedygoras, Penylan, *Storrie*.

O. incarnata L. 5. Kenfig Burrows, *Hb. Brit. Mus.*, and another locality.

O. latifolia L. Common.—× *maculata*. 8. Aberdare.

O. maculata L. Fairly common; no record for 3.—Subsp. *ericetorum* Linton. 4. Hills of Upper Neath Valley. 6. Ogmore Downs. 8. Aberdare, Cwmparc, Welsh St. Donat's.

Ophrys apifera Huds. 1. Oxwich, *S. W. Jenkins.* Penrice, *B. G.* 5. Margam, *B. G.* 6. Monknash. 7. Barry, *D.* Porthkerry and Flat Holme, *Lightf.* Aubrey Arms and Cowbridge, *W. F. Evans.* Sully, *Storrie.*

(*O. muscifera* Huds. 7. Barry Island, reported; also St. Nicholas, *Storrie.*)

(*Herminium Monorchis* Br. 7. Beaupré, *Cardiff Nat. Soc. Proc.* 1882.)

**Habenaria conopsea* Benth. 5. Margam Marshes. 6. Pencoed, Bridgend, *Storrie.* 7. Barry, *D.* 8. St. Fagan's, and 9. Llanishen, *Storrie.*

(*H. albida* Br. Near Cwm Ffrwd, *Storrie.*)

**H. viridis* Br. 1. Rhosili (var. *bracteata* A. Gray). 6. Bridgend, *Miss F. M. Williams.* 7. Llantrithyd, and 8. Hirwaun, *Storrie.*

**H. bifolia* Br. 1. Rhosili. 7. Barry, *D.* Boverton, *Storrie.* 8. St. Fagan's, St. George's, *Storrie.*

(*H. montana* Durand & Schinz. (*H. chlorantha* Bab.). 7. Sully Wood, and 8. St.-y-Nyll, *Storrie.* I have seen no specimen.)

Irideæ.

Iris fœtidissima L. 1. Nicholaston Woods. 2. Penllergaer, *Gutch.* 5, 6, 7. Common on sands and limestone. 8. Penarth, Lavernock, Leckwith.

I. Pseudacorus L. Common.—Var. *acoriformis* (Bor.). 1. Frequent. 3. Crumlin Bog. 5. Port Talbot, Aberafan to Baglan. 7. Porthkerry. 8. Peterston.

Amaryllideæ.

Narcissus Pseudo-narcissus L. 1. Rather common. 2. Penllergaer, *Hb. Motley.* 5. Gelli Bychan, *fl. pleno, Hb. Motley.* 6. Nottage, *J. Bot.* 1902, p. 317. Pencoed, *Cardiff Nat. Soc. Proc.* 1893. 7. Llantwit Major, *D.* 8. Coedriglan, &c., *Storrie.* 9. Penylan, *D.* Llanishen, &c., *Storrie.*

**Galanthus nivalis* L. 1. Cheriton, *Dillwyn.* Oxwich Woods, *S. W. Jenkins.* 2. Penllergaer, *Dillwyn.* 6. Tondu. 8. Cardiff, *J. Bot.* 1884, p. 257. 9. Coedygoras, Nant Dulas, *Storrie.* Quite possibly native.

Dioscoreæ.

Tamus communis L. Common.

Liliaceæ.

Ruscus aculeatus L. 1. Pwlldu, Three Cliffs Bay, Parkmill, Oxwich Point, Nicholaston Woods. 6. Coytrahen, *Storrie.* 7. Cowbridge, Swanbridge. Sully, The Leys, *Storrie.* 8. Peterston, Lavernock. Near Blaenrhondda Tunnel, *Rhondda Fl.*

Asparagus maritimus Mill. — *α altilis* L. 1. Sands, Oxwich Bay, close to the Rectory. 5. Port Talbot Docks.—*β maritimus* L. 1. Oxwich Bay, Broughton Bay. Worms Head, &c., *Gutch*. 2. Loughor, *Gutch*. 3. Singleton, *Flower*. 4. Briton Ferry, *Cardiff Nat. Soc. Proc.* 1882. 5. Sker, *Hb. Brit. Mus.* 7. Cowbridge, *B. G.* Fontigary, *Cardiff Nat. Soc. Proc.* 1882. 8. Cardiff, *B. G.*

**Polygonatum multiflorum* All. 7. Wenvoe. 8. Coedriglan, Llwyn-y-grant, *Storrie*. 9. Llanedan, *Storrie*.

**Convallaria majalis* L. 2. Penllergaer. 8. Coedriglan, *Storrie*. Little Garth Wood, *Hb. Cardiff*. Aberdare, now gone, *B. A. Williams*.

Allium vineale L. 1. Quoity Green. 3. Swansea, *Gutch*. 7. St. Hilary, *Storrie*. Fontigary. 8. Penarth. — Var. *bulbiferum* Syme. 6. S. Cornely, Porthcawl.—Var. *compactum* (Thuill.). 7. Porthkerry, *D*. Dinas Powys Moors, *Cardiff Nat. Soc. Proc.* 1891–2. 8. Cardiff, *Cardiff Nat. Soc. Proc.* 1891–2. Penarth to Lavernock. 9. Llanishen, Pengam Marshes.

**A. oleraceum* L. 9. Penylan, *D.*!

A. ursinum L. 1. Frequent. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895-6. 4. Neath, *W. M. R.* Glyn Neath, Neddfechan Glen, Ysgwd Eynon Gam. 7. Sully, *Storrie*. Barry, *D*. 8. Pontsarn, Penarth, Leckwith, Taffs Well. St. Fagan's, *Storrie*. 9. Cefn On, Craig Llanishen, Ruperra.

**Scilla autumnalis* L. 7. Nash Point to Dunraven, *Hb. Cardiff*.

S. verna Huds. 1. Swansea to Burry Holm. 6. Porthcawl to Sker. 7. Nash Point to Dunraven, Llancarfan, *Storrie*.

Endymion non-scriptum Garcke. Common.—*fl. albo*. 4. Hills above R. Perddyn. 5. Baglan, *Mrs. R. W. Llewellyn*. 8. Taffs Well.

**Gagea lutea* Gawl. 8. Castell Coch Woods, *Hb. Cardiff, fide Storrie*; specimen now gone.

Narthecium Ossifragum Huds. Rather frequent; no records for 6 and 7.

Paris quadrifolia L. 1. Llanmadoc. Nicholaston and other woods, *Gutch*. 3. Kilvey, *Gutch*. 4. Briton Ferry, *Gutch*. 6. Ewenny, *Miss F. M. Williams*. 7. Wenvoe. Cwm George, *Storrie*. 8. Taffs Well, Forest Wood, Ystradowen. Whitchurch, *Miss F. M. Williams*. Coedriglan, *Storrie*. St. Fagan's, *Hb. Cardiff*. 9. Llanishen, *D.*! Lisvane, *Hb. Cardiff*.

Juncaceæ.

Juncus bufonius L. Common. — Var. *fasciculatus* Koch. 1. Fairwood Common. 5. Port Talbot and Aberafan. 6. Porthcawl. 7. St. Athan's Road, Stalling Down.

J. squarrosus L. 2. Gowerton Common, Mynydd Garngoch, Loughor and Loughor Common. 3. Clydach, *Hb. Geldart*. 4. Hills of Upper Neath Valley. 5. Hills above Port Talbot. 8. Common on the hills. 9. Caerphilly.

J. Gerardi Loisel. 1. Frequent on the coast. 2. Loughor. 3. Swansea, *Gutch*. 4. Jersey Marine. 5. Port Talbot. 6. Estuary

of R. Ogmore, Newton Sands. 7. St. Athan's Road, Porthkerry. 9. Pengam Marshes.

J. inflexus L. Frequent.

J. effusus L. Frequent; no record for 6.

J. conglomeratus L. Frequent; no record for 9.— × *glaucus* (= *J. diffusus* Hoppe). 3. Crumlin Bog, *J. Bot.* 1892, p. 297. 8. Peterston Moors.

J. maritimus Lam. 1. Frequent. 2. Loughor. 4. Jersey Marine. 5. Port Talbot. 7. Sully Island. 8. Grangetown, *Storrie.*

J. acutus L. 1. Llangenydd, Oxwich, Whitford Burrows. 3. Crumlin Burrows. 4. Jersey Marine. 5. Margam Moors, Port Talbot. 6. Newton Nottage, *Gutch.*

J. bulbosus L. Frequent; no record for 6 and 7.—Var. *Kochii* Bab. 1. Fairwood Common, *Hb. Brit. Mus.*

J. obtusiflorus Ehrh. 1. Oxwich Bay, Rhosili Down, Whitford Burrows. 3 and 4. Crumlin Burrows. 5. Port Talbot. Kenfig Pool, *Hb. Motley.* 8. Peterston, Welsh St. Donat's, Ystradowen Moor.

J. articulatus L. Frequent; no record for 9.

J. alpinus Vill. 6. Porthcawl Sands. 8. Near Cardiff, *fide Ar. Bennett.*

J. acutiflorus Ehrh. Rather frequent; no record for 3.—Var. *multiflorus* Weihe. 4. Craig-y-llyn.

Luzula Forsteri DC. 3. Swansea, *Dillwyn.* 7. Coed Mawr, and 8. St. Fagan's, Coedriglan, &c., *Storrie.*

L. pilosa Willd. 1. Bishopston Valley, Llanmadoc. 4. Frequent. 5. Graigafan, *Hb. Motley.* 7. Coed Mawr, *Storrie.* 8. Aberdare Valley, Merthyr Tydfil, Garth Wood. St. Fagan's, Coedriglan, &c., *Storrie.* 9. Caerphilly, Craig Llanishen, Lisvane. —Var. *Borreri* Bromf. 9. Lisvane, *fide Ar. Bennett.* I could not see *L. Forsteri* in the locality.

L. sylvatica Gaud. 3. Ystalyfera. Glanrhyd, *Swansea Sci. Soc. Proc.* 1893. Swansea, *Moggridge.* 4. Melincourt Glen and the Upper Neath Valley, Craig-y-llyn. 7. Swanbridge, Wenvoe, &c., *Storrie.* 8. Aberdare, Rhondda Cliffs, Ystradowen. Penarth, St. Fagan's, &c., *Storrie.*

**L. campestris* Lam. & DC. Frequent; no records for 2 and 9.

L. multiflora Lej.—*α umbellata* Lond. Cat. Frequent.—*β congesta* Lond. Cat. 2. Loughor, *Hb. Bicheno.* 4. Aberpergwm, Craig-y-llyn. 8. Aberdare, Rhondda Valley.

Typhaceæ.

Typha latifolia L. 1. Oxwich, Llanrhidian. 2. Pantyffynon, Penllergaer, Gowerton, Mynydd Cadle. 3. Crumlin Bog. Glais to Pontardawe, *Swansea Sci. Soc. Proc.* 1893. 4. Jersey Marine. 5. Pools by the sea. 7. Barry and Cadoxton. Flemingstone Moors, *Storrie.* 8. Aberdare, Peterston, Ystradowen, Llantrissant, Taffs Well. 9. Cefn On. Pengam, *Storrie.*

T. angustifolia L. 1. Oxwich. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3 and 4. Crumlin Bog. 5. Port Talbot.

Sparganium erectum L. 1. Quoity Green. 2. Penllergaer. 3. Crumlin Bog. Singleton, *Gutch.* Glais to Pontardawe, *Swansea Sci. Soc. Proc.* 1893. 4. Neath, *Gutch.* Resolven. 6. Ewenny. 7. Llantwit Major, Cadoxton. 8. Llwydcoed, Peterston, Grangetown. 9. Caerphilly, Pengam Marshes.

**S. neglectum* Beeby. 1. Oxwich, Burry Green. 3. Crumlin Bog. 7. Cowbridge.

S. simplex Huds. 1. Killay to Penard, *G. C. D.* 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Crumlin Bog. Singleton, *Gutch.* 4. Neath, *Gutch.* 6. Porthcawl, *Lloyd.* 7. Cadoxton, *Storrie.* 8. Aberdare Valley. Leckwith, Llandaff, &c., *Storrie.*— Var. *longissimum* Fr. 3. Crumlin Bog.

**S. natans* L. 4. Llynfawr and Llynfach.

S. minimum Fr. 1. Pitton Common. 3. Crumlin Bog. Singleton Marsh, *Gutch.* Tennant's Canal. 8. Welsh St. Donat's. Hensol Lakes and Merthyr Canal, *Storrie.*

Aroideæ.

Arum maculatum L. Frequent; no records for 2 and 9.

**Acorus Calamus* L. 2. Penllergaer. 4. Briton Ferry, *Flower.*

Lemnaceæ.

Lemna trisulca L. 3. Swansea, *J. Bot.* 1890, p. 157. 5. Margam to Aberafan Moors. 7. Flemingstone Moors. 8. Grangetown. Glyncornel, &c., *Rhondda Fl.*

L. minor L. 1. Penard. 3. Crumlin Bog. 5. The moors. 6. Merthyr Mawr and Warren, Llantwit Major to Llandow. 7. Llandough, Cadoxton, Barry. 8. Aberdare Valley, Grangetown. Rhondda Valley, *Rhondda Fl.*

**L. gibba* L. 8. Canal in Aberdare Valley. Grangetown.

**L. polyrrhiza* L. 5. Port Talbot and Margam Moors. 8. Cardiff *Storrie.* Blaenycwm, &c., *Rhondda Fl.*

(*Wolffia arrhiza* Wimm. 8. Roath Dock, *Storrie.*)

Alismaceæ.

Alisma Plantago-aquatica L. Common.

A. ranunculoides L. 1. Oxwich. 3. Crumlin Bog. Singleton, Sketty Bog, *Gutch.* Coedyrallt, *Hb. Watson.* 4. Neath Canal, *W. M. R.* Llynfawr and Llynfach, *Brit. Ass. Handb.* 5. Kenfig Pool. 7. Sully, *D.* St. Hilary, St. Athan's, &c., *Storrie.* 8. Ystradowen.

Elisma natans Buchen. 3. Crumlin Bog, Singleton, *Flower.*

**Sagittaria sagittifolia* L. 2. Penllergaer. 5. Margam Moors. 9. Penrhiwceiber, Cardiff.

Butomus umbellatus L. 1. Oxwich Bay. 3. Crumlin Burrows and Tennant's Canal. 4. Resolven. 5. Margam Moors. 6. Ewenny, R. Ogmore. 7. Llantwit Major, Flemingstone Moors. Sully, Barry, *D.* Cadoxton, *Storrie.* 8. Cardiff, *Storrie.* 9. Llanishen, *Storrie.*

Naiadaceæ.

Triglochin palustre L. 2. Loughor Marsh, *Gutch*. 3. Crumlin Burrows. 4. Jersey Marine, Neath. 5. Margam Moors. 7. Merthyr Mawr. 8. Peterston, Ystradowen Moor.

T. maritimum L. Fairly common by the sea; no record for 6.

Potamogeton natans L. 1. Llangenydd Marsh. 2. Penllergaer, R. Loughor near Pantyffynon. 3. Crumlin Bog. 4. Neath. 5. Kenfig Pool. 6. Ewenny. 7. Cowbridge. 8. Aberdare, Merthyr Tydfil, Peterston, Welsh St. Donat's. Cardiff, *Storrie*.

P. polygonifolius Pour. 1, 4, 8. Frequent. 2. Cockett, Mynydd Garngoch. 5. Port Talbot. 9. Caerphilly.

(*P. coloratus* Hornem, *P. alpinus* Balb., *P. prælongus* Wulf., *P. obtusifolius* Mert. & Koch are included by *Storrie*, but no specimens are available.)

P. heterophyllus Schreb. 3. Crumlin Bog. 5. Kenfig Pool. 8. Cardiff, *Storrie*.

P. lucens L. 5. Kenfig Pool, *Hb. Motley*.

P. perfoliatus L. 2. Penllergaer. 5. Kenfig Pool. 8. Hensol, St. Fagan's, *Storrie*. Peterston.

P. crispus L. 2. Mynydd Garngoch. 3. Crumlin Bog and Tennant's Canal. 4. Neath, Glyn Neath. 5. Kenfig Pool. 6. Porthcawl. 7. Cadoxton, Cowbridge, &c., Flemingstone Moors 8. Peterston. St.-y-Nyll, *Storrie*.

P. densus L. 7. Cadoxton Moors, *D.* Llandough, Llantwit Major, Barry to Bonvilstone. 8. Cardiff, *Storrie*.

P. pusillus L. 1. Killay to Penard, *G. C. D.* 2. Pontardulais. 3. Tennant's Canal. 4. Neath Canal, *Gutch*. 5. On the moors. 7. St. Athan's Road. 8. Hirwaun to Penrhiwceiber.

P. pectinatus L. 3. Tennant's Canal, *J. Bot.* 1886, p. 377. 5. Kenfig Pool.

**P. interruptus* Kit. 2. Loughor. 5. Port Talbot. 7. St. Athan's Road. 8. Grangetown. — Var. *scoparius* Fryer. 1. Oxwich. 3. Tennant's Canal.

**Ruppia maritima* L. 3. Swansea, *Hb. Geldart*!

R. rostellata Koch. 1. North coast, *J. Bot.* 1892, p. 297. 2. Loughor. 3. Salthouse Point, *Flower*. 4. Neath Canal, *Flower*. 5. Port Talbot and Margam Moors. 7. The Leys.

**Zannichellia palustris* L. 1. Oxwich, Llanrhidian to Salthouse Point. 2. Loughor. 4. Neath. 5. Port Talbot and Kenfig. 7. Llandough. 8. Welsh St. Donat's. Cardiff.

Zostera marina L. 7. Flat Holme, *J. Bot.* 1891, p. 345. Sully, Barry, *Storrie*. 8. Penarth, *Storrie*.

Cyperaceæ.

(*Eleocharis acicularis* Roem. & Schultes. 3. Swansea, *Gutch*. 5. Graigafan, *Hb. Motley*. 8. Taffs Well, *Storrie*. 9. Caerphilly Castle, *Storrie*. This record must remain doubtful. Gutch's specimens so named are *S. setaceus*.)

E. palustris Roem. & Schultes. Common in low ground.

E. multicaulis Sm. 1. Frequent. 2. Gowerton Common.

3. Singleton and Neath Canal, *Gutch*. 8. Welsh St. Donat's. Cardiff, Llandaff, &c., *Storrie*. Hirwaun. 9. Pengam, *Storrie*. Near Caerphilly.

Scirpus pauciflorus Lightf. 1. Frequent. 3. Crumlin Bog. Swansea, *Hb. Bicheno*. 5. Kenfig, Aberafan to Baglan.

S. cæspitosus L. 1. Fairwood Common, Rhosili Down. 2. Mynydd Garngoch. 3. Swansea, *Gutch*. 4 and 8. Frequent in the hills. 8. Ystradowen Moor.

S. fluitans L. 1. Fairwood Common, Cefn Bryn. 3. Crumlin Bog. 4. Llynfach, *Storrie*. 8. Welsh St. Donat's, Ystradowen. St.-y-Nyll, *Storrie*.

S. filiformis Savi. 1. Common. 3. Swansea, *Gutch*. 4. Jersey Marine. 5. Graigafan, *Hb. Motley*. 6. Porthcawl, *Woods*. Most, if not all, is var. *monostachys* Hook. fil.

S. setaceus L. Rather frequent; no record for 7.

(*S. Holoschænus* L. 8. East Moors, *Storrie*.)

S. lacustris L. 3. Crumlin Bog. Swansea, *Gutch*. 6. Estuary of the Ogmore. 7. St. Athan's Road, Llandough. 8. Welsh St. Donat's, Peterston. St.-y-Nyll, *Storrie*. 9. Rumney River, *Storrie*.

S. Tabernæmontani Gmel. 1. Oxwich, Whitford Point, Salthouse Point. 2. Loughor. 3 and 4. Crumlin Bog. 5. Frequent. 7. St. Athan's Road.

S. maritimus L. Rather frequent. — Var. *compactus* Koch. 1. Oxwich Bay, Llanmadoc Marshes. 5. Aberafan.—Var. *monostachys* Sonder. 1. Oxwich Bay. 4. Crumlin Burrows. 5. Aberafan.

**S. sylvaticus* L. 1. Penllergaer, Pantyffynon. 8. Peterston, Taffs Well, Penrhiwceiber, Aberdare. 9. Lisvane, *Storrie*.

Eriophorum vaginatum L. Rather frequent; no records for 6 and 7.

E. polystachion L. Common; no records for 6 and 7.—Var. *longifolium* Hoppe. 1. Fairwood Common.

E. paniculatum Druce. 4. Banwell Mountain, *Flower & Lees*. Llynfach, *Storrie*. 8. Penderyn.

Rynchospora fusca Ait. 3. Crumlin Bog, *Hb. Brit. Mus*.

R. alba Vahl. 3. Crumlin Bog. Singleton, *Gutch*.

Schœnus nigricans L. 3. Crumlin Bog, *Westcombe*.

Cladium Mariscus Br. 3 and 4. Crumlin Bog.

Carex dioica L. 3. Crumlin and Sketty Bogs, *Gutch*. 4. Aberdylais, *Flower*. 6. Pencoed, Penprisc, *Storrie*. 8. Hills between Llwydcoed and Merthyr Tydfil.

C. pulicaris L. 1. Rhosili, Tankeylake Moor, Whitford Burrows. 2. Pantyffynon. 4. Craig-y-llyn, Llynfach, hills above R. Perddyn. 6. Ewenny Down. 8. Ystradowen Moor, Taffs Well, Cwmparc. 9. Frequent.

C. disticha Huds. 5. Margam Moors, Port Talbot. 8. Peterston, Ystradowen Moors.

C. arenaria L. Common; no records for 2 and 9.

**C. diandra* Schrank. 3. Sketty Bog, *Hb. Brit. Mus*. 8. Quaker's Yard, *Storrie*.

C. paniculata L. 1. Fairwood Common, Rhosili Down.

2. Penllergaer. 3. Crumlin Bog. Glanrhyd, *Swansea Sci. Soc. Proc.* 1893. 4. Below Craig-y-llyn, Neath, Tennant's Canal. 5. Port Talbot. Margam Marshes, *J. Bot.* 1902, p. 250. Glyncorwg, *Storrie.* 8. Aberdare, Ystradowen Moor, Llancaiach. Pontypridd, *Storrie.*

C. vulpina L. Rather frequent.

C. muricata L. Not unfrequent; no records for 3 and 4.

**C. Leersii* Schultz. 1. Swansea, *Rep. B. E. C.* 1889. 5. Pyle. 7. Llantwit Major to Monknash. 8. Aberdare.

**C. Pairæi* F. Schultz. 1. Rhosili. 5. Pyle, *J. Bot.* 1907, p. 163.

C. divulsa Stokes. 8. Cardiff.

C. echinata Murr. Frequent; no records for 5, 6, 7.

C. remota L. Rather frequent.

C. canescens L. 3. Crumlin and Sketty Bogs, *B. G.* 4. Llynfach. 8. Hirwaun Common.

C. leporina L. Rather frequent; no record for 6.

C. elata All. 3 and 4. Crumlin Bog. 5. Kenfig Pool, *Dillwyn.* 7. Flemingstone Moors.—× *acuta.* 3. Crumlin Bog.—× *Goodenowii.* 7. Flemingstone Moors.

C. acuta L. 6. Ogmore Castle.—× *Goodenowii.* 3. Crumlin Bog.

C. Goodenowii Gay. Common; no record for 7.—Var. *recta* (Fleischer). 5. Port Talbot. 8. Aberdare.—Var. *juncella* (T. M. Fries). 3. Crumlin Bog. 8. Aberdare.—Var. *melæna* (Wimm.). 5. Margam Moors. 8. Aberdare.

C. flacca Schreb. Common.

C. limosa L. 3. Crumlin Bog, *Hb. Brit. Mus.* Sketty Bog, *B. G.*

**C. montana* L. 6. Ewenny Downs in great abundance.

C. pilulifera L. 1. Pitton Green. 4. Hirwaun Common, hills above Aberpergwm. 6. Ewenny Down. 8. Hirwaun, Mountain Ash. 9. Caerphilly Common.

C. caryophyllea Latour. 1. Common. 4. Glyn Neath. 5. Pyle. Graigafan, *Hb. Motley.* 6. Ogmore Down. 7. Barry Island. 8. Aberdare, Mountain Ash, Morlais Castle. 9. Caerphilly, Craig Llanishen. Penylan, Coed-y-goras, *Storrie.*

C. pallescens L. 4. Frequent. 5. Ynysygwas, *Hb. Motley.* 8. Aberdare, Mountain Ash. 9. Lisvane.

C. panicea L. Rather frequent; no records for 6 and 7.

C. pendula Huds. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Glanrhyd, *Swansea Sci. Soc. Proc.* 1893. 4. Glyn Neath to Resolven. 7. Porthkerry. 8. Leckwith. The locality on which Top. Bot. record depends is in Caermarthenshire.

C. strigosa Huds. 3. Crumlin and Sketty Bogs, *Flower.*

C. sylvatica Huds. 1. Penard, Bishopston, Killay. 4. Aberpergwm, Perddyn Gorge. 5. Margam. 7. Merthyr Dyfan, Wenvoe, Cadoxton, Llandough. 8. Aberdare, Taffs Well, Forest Wood, Ystradowen. 9. Cefn On, Llanishen, Rudry, Lisvane.

C. helodes Link. 1. Oystermouth, *Woods.* 3. Ystalyfera. 4. Neddfechan Gorge. 8. Taffs Well. Quaker's Yard, *B. G.* 9. Common on the Caerphilly hill range.

**C. binervis* Sm. Common on moors and hills in 1, 2, 4, 5, 8.

C. distans L. 1. Three Cliffs Bay, Llanmadoc, Llanrhidian.

Gowerton, *J. Bot.* 1892, p. 297. 2. Loughor, *Hb. Motley.* 5. Port Talbot. 7. Aberthaw, St. Athan's Road, Barry Island. 9. Pengam Marshes.

C. fulva Host. 1. Clyne Common, *Hb. Brit. Mus.* 2. Mynydd Garngoch, Gowerton Common. 3. Ystalyfera. 4. Hills above R. Perddyn. 8. Penderyn, Hirwaun, Ystradowen Moor.

C. extensa Good. 1. Three Cliffs Bay, Whitford Point. 4. Crumlin Burrows. 7. Porthkerry, Estuary of R. Ddaw.

C. flava L. Common; no record for 5 and 6. Generally var. *minor* Towns., but type at 4. Craig-y-llyn, &c.

**C. Œderi* Ehrh. 3. Swansea, *J. Bot.* 1886, p. 112. 5. Aberafan, Port Talbot.

C. hirta L. Rather common; no record for 3.—var. *hirtæformis* Pers. 5. Margam Moors, Port Talbot. 8. Merthyr Tydfil.

**C. Pseudocyperus* L. 3. Crumlin Bog, *Lightf.*

C. acutiformis Ehrh. 3. Crumlin Bog. 4. Neath, Tennant's Canal. 5. Margam Marshes, *Hb. Brit. Mus.* Baglan Marshes. 6. Ogmore Castle (with var. *Kochiana* DC.). 8. Aberdare, Welsh St. Donat's, Peterston, Ystradowen Moor. — × *riparia.* 8. Peterston.

C. riparia Curtis. Rather frequent; no record for 9.

C. inflata Huds. (*rostrata* Stokes). Rather frequent; no records for 7 and 9.

**C. vesicaria* L. 8. Aberdare, Peterston Moor. Cardiff, *Storrie.*

Gramineæ.

[I owe much of the following information to Professor Hackel, of St. Poelton.]

Phalaris arundinacea L. Frequent.

**Anthoxanthum odoratum* L. Common.

**Alopecurus myosuroides* Huds. 5. Port Talbot. 7. Merthyr Dyfan. 8. Penarth, *Storrie.* 9. Pengam Salt-marshes.

(*A. æqualis* Sobol. 8. Grangetown, Leckwith, &c., *Storrie.*)

A. geniculatus L. Common; no record for 6.

A. bulbosus Gouan. 1. Gowerton, *J. Bot.* 1892, p. 297. 7. Porthkerry. 8. Cardiff, E. Moors. 9. Pengam Marshes, much.

A. pratensis L. 1. Llanrhidian. 4. Glyn Neath. 5. Port Talbot Marshes, Kenfig. 6. Porthcawl, *Lloyd.* 7. Wenvoe, Sully, Cadoxton, &c. 8. Aberdare, Peterston.

Milium effusum L. 4. Resolven, *J. Bot.* 1892, p. 297. 5. Margam, *Hb. Motley.* 7. Dinas Powys, *Storrie.* 8. Mountain Ash; Forest Wood, Ystradowen. Llandaff, *Storrie.*

Phleum pratense L. Frequent; no record for 9.—Var. *nodosum* (L.). 1. Whitford Burrows, Port Eynon. 6. Merthyr Mawr, Porthcawl to S. Cornely. 7. Cadoxton, Stalling Down. 8. Aberdare.

P. arenarium L. 1. Penard, Oxwich, Burry Holm to Whitford Burrows. 3. Swansea, *Hb. Bicheno.* 4. Briton Ferry, *Hb. Brit. Mus.* 5. Sker, *Hb. Motley.* Aberafan. 6. Porthcawl. 8. Cardiff, *Storrie.*

Agrostis setacea Curtis. 1. Cefn Bryn, Frog Moor, cliffs Ox-

wich to Port Eynon. 6. S. Cornely, Ewenny Down. Stormy Down, *Woods*. St. Mary Hill Down, Waun near Pencoed, *Storrie*. 7. Stalling Down, coast near St. Athan's Road. 8. Welsh St. Donat's.

A. canina L. 2. Gowerton Common, Mynydd Garngoch. 3. Crumlin Bog, Ystalyfera. 4. Hirwaun Common. 7. Stalling Down. 8. Welsh St. Donat's. 9. Caerphilly. Llanishen, *Storrie*. —Var. *mutica* Doell. 7. Llandough by Cowbridge.

A. alba L. Frequent; no record for 9.—Var. *stolonifera* (L.). 1. Oxwich. 3. Crumlin Bog. Swansea, *Gutch*. 5. Port Talbot. 7. Barry. 8. Aberdare. Cardiff, *Hb. Cardiff*. —Var. *sylvatica* Aschers. & Graebn. 5. Port Talbot. 8. Cardiff.—Var. *gigantea* Meyer. 5. Port Talbot.—Var. *prorepens* Aschers. 5. Aberafan Moors.—Var. *maritima* Meyer. 1. Oxwich and Langland Bays. 4. Jersey Marine. 5. Port Talbot, Aberafan. 7. The Leys. 8. Cardiff Docks.—Var. *coarctata* Blytt. 1. Oxwich Bay, Three Cliffs Bay, Burry Holm. 5 and 6. Moors by the sea, common. 7. St. Athan's Road, The Leys. 8. Cardiff.

A. tenuis Sibth. Common; no record for 9.—Var. *pumila* (L.). Frequent; no record for 2 and 9.

Calamagrostis epigeios Roth. 1. Horton. 2. Loughor, *Hb. Motley*. 3. Swansea, *Gutch*. 6. Porthcawl Sands. 7. Sully Island, The Leys, Porthkerry.

(*C. lanceolata* Roth. 3. Common at Swansea, *Gutch*. Probable error; specimen so labelled in *Hb. Motley* is *Trisetum flavescens*, and I have never seen the species in Glamorgan.)

Ammophila arenaria Link. Sands in 1, 3, 4, 5, 6, 7.

Aira caryophyllea L. Common.

A. præcox L. Common; no record for 6.

**Corynephorus canescens* Beauv. 5. Aberafan and Port Talbot, native. 8. Cardiff Docks, *Storrie*; introduced.

Deschampsia cæspitosa Beauv. Common.—Var. *brevifolia* Parn. 3. Ystalyfera, Peterston.

D. flexuosa Trin. Common.

Holcus mollis L. Frequent, especially in 8 and 9.

H. lanatus L. Common.

Trisetum flavescens Beauv. Frequent on the limestone; less so elsewhere. No records for 2 and 4.

Avena pubescens Huds. 1. Rhosili, glabrous form; cliffs of Gower in several places. 6. Ewenny Down. 7. Cold Knap, Swanbridge. 8. Morlais Castle.

**A. pratensis* L. 7. Porthkerry, Swanbridge.

Arrhenatherum elatius Mert. & Koch. Common.—Var. *nodosum* Reichb. Rather commoner.

Sieglingia decumbens Bernh. Common.

Phragmites vulgaris Druce. Fairly common.

Cynosurus cristatus L. Common.—Var. *ovatus* Aschers. & Graebn. 1. Port Eynon, Worms Head, &c. 7. Nash Point.

Koeleria cristata Pers. 1. Penard to Broughton Burrows. 6. Ewenny Down. Pwllcawl, *Hb. Motley*. 7. Barry Island. 8. Pontypridd, &c., *Storrie*. 9. Llanishen, Caerphilly, *Storrie*.

Molinia cærulea Moench. Frequent; no record for 6.

(*Catabrosa aquatica* Beauv. 8. Cardiff, and 9. Pengam Moors, *Storrie.*)

Melica nutans L. 1. Llanrhidian, Nicholaston Woods, &c. 3. Ystalyfera. 4. Melincourt and Neddfechan Glens. 7. Wenvoe, Ystradowen. 8 and 9. Frequent.

Dactylis glomerata L. Very common.—Var. *congesta* Gren. & Godr. 1. Oxwich to Burry Holm. 5. Port Talbot. 8. Aberdare.

Briza media L. 1. Frequent on the cliffs. 2. Gowerton. 4. Rhigos, Resolven. 6. Porthcawl to S. Cornely, Ogmore Down. 7, 8, 9. Frequent.

Poa annua L. Very common.

**P. bulbosa* L. f. *vivipara.* 7. Barry. This is the Continental form, which, however, occurs also in England in native localities. I consider it native here.

**P. nemoralis* L. 1. Reynoldstone. 6. Pencoed, Coed Mwstwr, *Storrie.* 8. Llandaff. Coed Mawr, St. Fagan's, *Storrie.*

**P. compressa* L. 1. Oxwich, Horton. 5. Port Talbot Docks. 7. Cadoxton. 8. Aberdare, Dowlais, Cardiff Docks. 9. Caerphilly. —Var. *polynoda* (Parn.). 1. Oxwich. 8. Aberdare.

P. pratensis L. Common; no records for 2 and 5.—Var. *subcærulea* (Sm.). Common. — Var. *angustifolia* (L.). 5. Graigafan, *Hb. Motley.* Port Talbot Docks. 8. Hirwaun.

P. trivialis L. Common.—Var. *parviflora* Parn. 8. Aberdare.

Glyceria fluitans Br. Common; no record for 6.—Var. *pedicellata* Towns. 1. Oxwich, Whitford Burrows. 3. Crumlin Bog. 4. Neath. 5. Port Talbot Docks. 7. Llantwit Major, Merthyr Dyfan. 8. Aberdare. 9. Caerphilly.

G. plicata Fr. 1. Rhosili, Llanmadoc. 2. Loughor. 3. Crumlin Bog. 5. Margam Moors. 6. Merthyr Mawr. 7. Cowbridge. 8. Aberdare, Penrhiwceiber, Peterston, Llandaff, Llantrissant. 9. Craig Llanishen, Lisvane. — Var. *depauperata* Crépin. 1. Llangenydd. 3. Ystalyfera. 5. Port Talbot, *J. Bot.* 1902, p. 250.

G. aquatica Wahlb. 1. Parkmill. 2. Loughor. 3. Crumlin Bog. 4. Jersey Marine, Neath, Resolven. 5. Port Talbot to Margam. 6. Ewenny. 7. Flemingstone, Cadoxton. 8. Penarth, *Storrie.*

G. maritima Mert. & Koch. 1. Penard to Oxwich, Rhosili, Penclawdd. 4. Neath, *Westcombe.* 5. Frequent. 7. Estuary of R. Ddaw. Flat Holme, *J. Bot.* 1891, p. 345. 8. Cardiff. 9. Pengam Marshes.

G. distans Wahlb. 1. Llanmadoc. 2. Loughor, *Hb. Motley.* 3. Llandwr, *Gutch.* Swansea, *Hb. Cardiff.* 5. Port Talbot, Margam Moors. 7. St. Athan's Road, Porthkerry. 8. Cardiff. 9. Pengam Marshes.

**G. Borreri* Bab. 8. Cardiff Docks.

Festuca procumbens Kunth. 8. Cardiff. 9. Pengam Marshes.

F. rigida Kunth. Frequent; no record for 4.

F. rottboellioides Kunth. 1. Penard to Burry Holm, common. 3. Swansea. 6. Porthcawl. 7. St. Donat's to Nash Point. Cold

Knap, *Storrie*. Flat Holm, *Hb. Brit. Mus.* 8. Aberdare. Penarth, E. Moors, *Storrie*.

F. membranacea Druce (*fasciculata* Forsk. *uniglumis* Soland.). 1. Frequent. 3. Swansea, *Hb. Cardiff*. 4. Briton Ferry, *Hb. Brit. Mus.* 5. Port Talbot, Aberafan. 6. Porthcawl. 8. Ballast, Cardiff, *Storrie*.

F. Myuros L. 8. Aberdare, Peterston, Cardiff Docks.

F. bromoides L. Frequent.

F. ovina L. Rather frequent; no record for 5.

F. rubra L. Common.—Var. *arenaria* (Osbeck). 1. Penard, Oxwich Bay. Langland Bay, *W. M. R.*—Var. *pruinosa* Hackel. 1. Paviland to Rhosili. 7. Swanbridge, Porthkerry, Aberthaw to Llantwit Major.

**F. sylvatica* Vill. 3. Ystalyfera.

F. elatior L. Rather frequent; no record for 3 and 6.—Var. *pseudo-loliacea* Hackel. 3. Near Killay, &c., *Gutch*. 4. Pontneddfechan, *Gutch*. 8. Cardiff and Aberdare.—Var. *pratensis* Huds. 5. Graigafan, *Hb. Motley*. 7. Llandough. 8. Aberdare.

**F. arundinacea* Schreb. 1. Parkmill, Llangenydd. 5. Port Talbot. 7. Nash Point, Aberthaw, Porthkerry, Barry Island, Cadoxton, Swanbridge. 8. Cardiff, Aberdare. 9. Pengam Marshes.

Bromus giganteus L. 1. Black Pill, *W. M. R.* Penrice, Oxwich to Port Eynon. 3. Swansea, *Gutch*. 4. Neddfechan Glen. 5. Baglan, *W. M. R.* 6. Laleston. 7. Llandow, Marcross, Cowbridge, Barry, Cadoxton to Wenvoe. 8. Aberdare, Peterston, Welsh St. Donat's. 9. Rudry.

B. ramosus Huds. 1. Common. 3. Swansea, *Gutch*. 4. Neddfechan Glen, Glyn Neath, Resolven. 6, 7, 9. Frequent. 8. Aberdare, Taffs Well, Peterston, Welsh St. Donat's. Caerau, Roughbreak, Coedriglan, &c., *Storrie*.

**B. erectus* Huds. 5. Port Talbot. 6. Porthcawl, S. Cornely, Ewenny. 7. Cadoxton, Swanbridge, Porthkerry, Llantwit Major, Nash Point. 8. Aberdare, Welsh St. Donat's. Cardiff, *Storrie*.—Var. *villosus* Bab. 8. Aberdare.

**B. sterilis* L. Common.

B. commutatus Schrad. 1. Oxwich, Penclawdd. 5. Port Talbot. 6. Ewenny Bridge. 7. Barry, Llantwit Major. 8. Aberdare, Merthyr Tydfil. Cardiff, &c., *Storrie*. 9. Pengam Marshes.

B. mollis L. Common.—Var. *glabratus* Doell. 1. Langland Bay, *W. M. R.* Rhosili. 3. Swansea, *Wats. B. E. C. Rep.*, 1888–9. 7. Barry. 8. Aberdare.—Var. *leptostachys* Pers. 6. Porthcawl. 8. Aberdare.—Var. *Thominii* (Hard.). 8. Aberdare.—Var. *Lloydianus* Gren. & Godr. 1. Penard to Broughton Bay. 5. Aberafan. 7. Llantwit Major.—Var. *hordeaceus* Fr. 1. Penard.

Brachypodium sylvaticum Roem. & Schult. Common.—Var. *glabrescens* Syme. 5. Pyle *Hb. Motley*.

**B. pinnatum* Beauv. 7. Cold Knap, native. 8. Aberdare, introduced.—Var. *pubescens* Syme. 7. Cold Knap.

Lolium perenne L. Common.—Var. *aristatum* Schum. 5. Port Talbot. 8. Aberdare.—Var. *italicum* (Braun.). Frequent; no records for 4 and 6.—Var. *cristatum* Doell. 1. Llangenydd. 5.

Port Talbot. 8. Ystradowen Moor.—Var. *sphærostachyum* M. Masters. 8. Aberdare. 9. Pengam Marshes.

Triticum caninum L. 2. Gowerton, near Pantyffynon. 3. Ystalyfera. 4. Resolven, Neddfechan and Perddyn Glens. 7. Cog, *Storrie*. 8. Aberdare. Cardiff, Llandaff, &c., *Storrie*.

T. repens L. Frequent. — Var. *barbatum* Duval-Jouve. 1. Oxwich. Langland Bay, *W. M. R.* 4. Glyn Neath. 5. Port Talbot. 6. S. Cornely, Porthcawl. 7. On the coast. 8. Cardiff.—f. *glauca*. 5. Frequent by the sea. 7. Cold Knap, St. Athan's Road. 8. Cardiff Docks. 9. Pengam Marshes.

**T. pungens* Pers. 6. Porthcawl. 8. Cardiff.

T. junceum L. 1, 3, 4, 5. Frequent. 6. Porthcawl. 7. The Leys. 8. Penarth Ferry, *Hb. Cardiff*. — Var. *megastachyum* Fr. 3 and 4. Crumlin Burrows. 5. Port Talbot.— × *repens*. 5. Port Talbot. 6. Porthcawl.

Lepturus filiformis Trin. 1. Gowerton. 2. Loughor, *Hb. Motley*. 3. Port Tennant, *Gutch*. 4. Neath. 5. Port Talbot, Margam Marshes. 7. St. Athan's Road, Porthkerry. Sully, Barry, &c., *Storrie*. 8. Cardiff, Grangetown. 9. Pengam Marshes.

Nardus stricta L. 1, 2, 3, 4, 5, 8, 9. Common. 6. Ewenny.

Hordeum nodosum L. Rather frequent; no record for 4.

H. murinum L. Rather frequent; no record for 2.

**H. marinum* Huds. 3. Swansea, *B. G.* 7. The Leys.

**Elymus arenarius* L. 3. Swansea, *Moggridge*. 5. Port Talbot. 7. Porthkerry, *Storrie*.

Filices.

Hymenophyllum tunbridgense Sm. 4. Melincourt Glen, *Westcombe*. Brincous, *Dillwyn*. Pontneddfechan, *B. G.* (8. Near Pentre, and above Blaen Rhondda, *Storrie*.)

H. peltatum Desv. 4. Melincourt Glen, *Newman*, *Hist. Br. Ferns*. Pontneddfechan, *Prof. Salter*. Craig-y-llyn. 8. Daren Bwllfa. Padell-y-Bwlch, *B.A. Williams*. Cwm Selsig, and Graigfach and Graigfawr, Treorchy.

Adiantum Capillus-Veneris L. 6 and 7. Barry Island to Dunraven and Southerndown. 8. Aberdare. Mr. Comley, gardener to Mr. James Lewis, told me that he found this species in abundance on a hill in the Cynon Valley thirty-five years ago. It has now disappeared.

Pteris aquilina L. Common.

Cryptogramme crispa Br. 8. Daren Bwllfa. Ferndale, *Rhondda Fl.* Padell-y-Bwlch, *B. A. Williams*.

Blechnum Spicant With. Common; no record for 6.

Asplenium lanceolatum Huds. 1. Penmaen, *Hb. E. F. Linton*! 2 and 3. Town Hill, Swansea, *Gutch*. 8. Pontypridd, *Hb. Cardiff*!

A. Adiantum-nigrum L. Frequent.

A. marinum L. 1. Oystermouth to Rhosili. 4. Briton Ferry, *Lightf.* Neath, *Newman*. 6. Dunraven, *Newman*. 7. Nash Point, *Lightf.* Barry Island. Flat Holme, *J. Bot.* 1891, p. 345.

A. viride Huds. Watson's record ("Lees sp.") was from a Breconshire locality. 4. Pontneddfechan, *Gutch*. 8. Morlais Castle.

A. Trichomanes L. Common.

A. Ruta-muraria L. Common; no record for 5.

Athyrium Filix-fœmina Roth. Frequent. — Var. *erectum* Syme. 1. Fairwood Common. 3. Crumlin Bog. 8. Mountain Ash, Hirwaun.—Var. *molle* Roth. 8. Mountain Ash. — Var. *incisum* Roth. 4. Aberpergwm.

Ceterach officinarum DC. Common; no record for 9.— Var. *crenatum* Milde. 4. Glyn Neath. 8. Aberdare.

Phyllitis Scolopendrium Newm. Frequent; no record for 2.

Cystopteris fragilis Bernh. 4. Craig-y-llyn, *Brit. Ass. Handb.* 8. Aberdare, Morlais Castle, Pontsarn, Dowlais, Rhondda Valley.—Var. *dentata* Hook. 3. Kilvey Hill, *Gutch.* 4. Neath Valley, *Dillwyn.*

(*Polystichum Lonchitis* Roth. 4. Pontneddfechan, *B. G.*)

P. lobatum Presl. 1. Penrice, Oxwich, Nicholaston Woods. 3. Swansea, *Gutch.* Ystalyfera. 4. Glyn Neath, Neddfechan Glen, Perddyn Gorge, Hirwaun Common. 5. Mawdlam to S. Cornely. 6. Merthyr Mawr, Ewenny. 7. Cwrtyrala, *Cardiff Nat. Soc. Proc.* 1867. 8. Garth Wood. St. Fagan's, Coed Mawr, Coed-y-Mwstwr, &c., *Storrie.*—Var. *aculeatum* Syme. 1. Penrice. 4. Glyn Neath.

P. angulare Presl. 1. Oxwich, Nicholaston Woods, Llanmadoc, Llangennydd, Reynoldstone. 3. Swansea to Crumlin Bog, *Gutch.* 4. Craig-y-llyn, Hirwaun Common, Glyn Neath. 5. Mawdlam to S. Cornely. 7. Llandough, Ystradowen. 8. St. Fagan's, &c., *Storrie.*

Lastrea Thelypteris Bory. 3. Sketty Bog, Cwmbwrla, &c., *Gutch.* 4. Llynfach.

L. montana T. Moore. Common; no record for 7.

L. Filix-mas Presl. Common.—Var. *affinis* Bab. 1. Llangennydd. 8. Garth Wood.—Var. *paleacea* Moore. 8. Padell-y-Bwlch, Mountain Ash.

L. spinulosa Presl. 3. Crumlin Bog. 6. Maesteg, *Dillwyn.*

L. aristata Rendle & Britten. 1. Oxwich, Rhosili. 2, 3, 4, 8. Frequent. 9. Caerphilly, Lisvane.—Var. *alpina* Moore. 8. Mountain Ash.

L. æmula Brackenridge. 4. Melincourt Glen, *Newman.* Craig-y-llyn, *Brit. Ass. Handb.* 7. Barry, Porthkerry, *Storrie.*

Polypodium vulgare L. Common. — Var. *cambricum* Willd. 4. Neath Valley, *Gutch.* 7. Dinas Powys, *Ray.*

Phegopteris Dryopteris Fée. 2. Pontardulais. 4. Woods at Ysgwd Eynon Gam, Glyn Neath; Tyn Ton, Rhigos. Ponthenrhyd, *Bot. Looker Out*, 1842. Craig-y-llyn, *B. A. Williams.* 7. St. Hilary, *Storrie.* 8. Aberdare, Padell-y-Bwlch. Graigfach, Cwmparc.

P. calcarea Fée. 8. Morlais Castle. Old wall on Hirwaun Common, *B. A. Williams.*

P. polypodioides Fée. 2. Penllergaer, *Dillwyn.* 3. Ystalyfera. 4. Melincourt Glen, Craig-y-llyn, Rhigos, Perddyn Woods. Ponthenrhyd, *Bot. Looker Out*, 1842. 5. Ffwrch Twm, *Hb. Motley.* 8. Cliffs of Aberdare and Rhondda Valleys. Quaker's Yard, *Cardiff Nat. Soc. Proc.* 1891–2.

Osmunda regalis L. 1, 2, 3, 4, 5. Frequent. 6. Llangynwyd, *Storrie*. 8. Ystradowen, *Mrs. Owen*. Aberdare, Mountain Ash.

Ophioglossum vulgatum L. 1. Frequent, *E. L. Pontifex*. 2. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 4. Glyn Neath. Pencaedrain, *Salter*. 5. Aberafan Marshes. Kenfig, *Hb. Brit. Mus.* 6. Porthcawl, *Lloyd*. 7. Cowbridge, *W. F. Evans*. Wenvoe, *Miss Jenner*. 8. Frequent.—Var. *polyphyllum* Braun. 1. Whitford Burrows, *fide E. F. L.*

Botrychium Lunaria Sw. 1. Penrice, Nicholaston Woods, &c., *Gutch*. 3. Drymma, *Dillwyn*. 4. Penderyn Foel, *D*. 6. Coychurch and Newton Nottage, *Storrie*. 7. Cowbridge. Llanbleiddian, *W. F. Evans*. 8. Garth Wood. Clydach Vale, Abercynon, *B. A. Williams*. Aberaman, *J. Morris*. Coedriglan, Llantrithyd, *Storrie*.

Equisetaceæ.

Equisetum maximum Lam. 1. Mumbles Road. 3. Sketty Burrows. 4. Perddyn Gorge. 7. Barry, Cadoxton, Porthkerry, Merthyr Dyfan. 8. Off the coal-measures. 9. Cefn On, Llanishen, Lisvane.

E. arvense L. Common.—Var. *nemorosum* Braun. 1. Parkmill, Reynoldstone. 4. Pontwhalby, *Woods*. 9. Caerphilly.

E. sylvaticum L. 2. Penllergaer to Gowerton. 3 and 4. Common, *Dillwyn*. 6. Maesteg, *Hb. Motley*. 8, 9. Frequent. — Var. *capillare* (Hoffm.). 9. Cefn On, near Caerphilly Tunnel.

E. palustre L. Common.—Var. *polystachyon* auct. 3. Crumlin Burrows. 8. Ystradowen.—Var. *nudum* Newm. 3. Crumlin Burrows. 8. Hirwaun.

E. limosum L. and var. *fluviatile* (L.). Thinly scattered throughout the county ; no records for 6 and 9.

E. hyemale L. 2. Penllergaer, *Dillwyn*. 3. Crumlin Bog, *Gutch*. 8. Tongwynlais and Melingriffith, *Storrie*.

E. variegatum Schleich., *α arenarium* Newm. 3 and 4. Crumlin Bog, in quantity.

Lycopodiaceæ.

Lycopodium Selago L. 3. Swansea, *Dillwyn*. 4. Craig-y-llyn.

L. clavatum L. 3. About Swansea, *Dillwyn*.

(*L. alpinum* L. 4. Near Swansea, *Moggridge* ; also Swansea Valley, *Dillwyn*. Probably Caermarthenshire.)

Selaginellaceæ.

(*Selaginella selaginoides* Link. 4 and 5. Glyn Corwg and Carnfach, *Storrie*. I have not seen specimens.)

Isoëtes lacustris L. 4. Llynfach.

(*I. echinospora* Dur. 4. Near Llynfawr, *Cardiff Nat. Soc. Proc.*, 1895. I have not seen specimens.)

Marsileaceæ.

Pilularia globulifera L. 4. Llynfach, *B. G.* 8. Welsh St. Donat's.

Characeæ.

Chara fragilis Desv. 1. Pilton Green. 3. Crumlin Burrows. 5. Port Talbot. 6. Porthcawl Sands. 9. Roath.—Var. *delicatula* Braun. 8. Welsh St. Donat's, Merthyr Tydfil.

C. aspera Willd. 1. Oxwich. 5. Kenfig Pool. 8. Cardiff, *Hb. Brit. Mus.*

C. contraria Kuetz. 1. Oxwich, *H. & J. G.* 5. Kenfig Pool.

(*C. hispida* L. 3. Crumlin Bog, *B. G.*)

C. vulgaris L. 3 and 4. Crumlin Bog. 5. Port Talbot. 6. Porthcawl Sands. — Var. *longibracteata* Kuetz and var. *papillata* Wallr. 6. Porthcawl Sands.

Tolypella glomerata Leonh. 3. Crumlin Burrows, *J. Bot.* 1886, p. 377.

(*Nitella flexilis* Agardh. 3. Crumlin Bog, *B. G.*)

N. opaca Agardh. 1. Clyne Common, *J. Bot.* 1886, p. 377. 7. Llandough, Cowbridge. 8. Welsh St. Donat's.

GLAMORGANSHIRE ALIENS.

The long list of aliens recorded for the county contains a large number of mere dock casuals, and a smaller number of plants of a more permanent character which persist as individuals, and also plants which have gained a settled footing, appear often in new spots, and spread without difficulty, e. g. *Saponaria officinalis* and *Lepidium Draba.*

The line between the native and the alien is difficult to draw. It has seemed advisable to keep in the list of native plants all those which were more probably native; and to put among the aliens those which were more probably not native. The present Glamorgan list is, it is hoped, only preliminary to a larger and more complete account of the county flora; and doubtless some judgements will, in the light of criticism and further experience, be subsequently reversed. It is, of course, to be understood that the judgment in each case refers only to the species so far as its occurrence in Glamorgan is concerned; not to its British status. A weakness in the treatment perhaps exists in the too great deference paid to "authority," even such a great one as that of H. C. Watson: plants like *Coronopus didymus*, and some of the Valerianellas should perhaps be ruthlessly treated as aliens; but my experience in the county shows them in rather more likely-looking spots than, e. g. *Ranunculus arvensis*, *R. sardous*, the poppies, *Brassica alba*, *B. Napus*, *B. Rapa*, *Diplotaxis tenuifolia*, *Raphanus Raphanistrum*, *Thlaspi arvense*, *Lychnis Githago*, *Anthemis arvensis*, &c. Some of these and other species are recorded in *Top. Bot.* as native on the strength of old records, one or two of which refer to cornfield habitats alone, though most of them are made on even weaker evidence. The cornfield plant is not easy to deal with;

but in cases where the plant is usually found on rubbish-heaps or plainly as a ballast introduction, any cornfield occurrence at once becomes of less value. It would be impossible to say that *Ranunculus arvensis*, *R. sardous*, *Brassica Napus*, &c., are not native anywhere in the county; but I am forced to the conclusion that it is very unlikely that they are native.

In my opinion, the occurrence of annuals in cornfields, on rubbish-heaps, dock ballast, &c., *and nowhere else in the county*, makes it more probable than not that they are not native within the area.

Ranunculaceæ.

Adonis annua L. 6. Near Tondu, *Storrie*. 8. Penarth, *Storrie*. Coedriglan, *Brit. Ass. Handb.*

Anemone apennina L. and *A. ranunculoides* L. 2. Penllergaer, *Hb. Motley*. — *A. japonica* Sieb. & Zucc. 7. Wenvoe Woods, *Hb. Cardiff*.

Delphinium Ajacis L. 3. Swansea Bay, *N. B. G.* 5. Port Talbot Docks. 8. Cardiff Docks.

Helleborus viridis L. 8. Near Cardiff, *J. Bot.* 1884, p. 257.

Nigella damascena L. 7. Sully, and 8. E. Moors, Cardiff, *Hb. Cardiff*.

Ranunculus arvensis L. 1. Cornfields, Newton and Caswell Bay, *Flower & Lees*. 6. Porthcawl, *Hb. Cardiff*. 8. Aberdare. Penrhys Farm, *Rhondda Fl.* 9. Caerphilly, *Storrie*. — *R. sardous* Crantz. 1. Killay, *Swansea Sci. Soc. Proc.* 1892–3. 7. Barry, on ballast, *Cardiff Nat. Soc. Proc.* 1891–2. 8. Cardiff Docks.—Var. *parvulus* (L.). 3. Swansea, *B. G.* 8. Cardiff Docks.

Berberideæ.

Berberis vulgaris L. 3. Near Swansea, *Swansea Sci. Soc. Proc.* 1891–2. 5. Plantation, Margam. 6. Merthyr Mawr. 7. Flemingstone and St. Nicholas, *Storrie*. 8. Llandaff Bridge, *Hb. Cardiff*.

Papaveraceæ.

Hypecoum procumbens L. 5. Port Talbot Docks.

Papaver Argemone L. 3. Swansea, frequent in cornfields, *Flower & Lees*. 8. Ballast at Cardiff, Penarth, &c., *Storrie*. Ynyshir, *Rhondda Fl.* — *P. dubium* L. Aggregate from districts 1, 3, 6, 8. Nowhere probably native.—a. *Lamottei* (Bor.). 1. Oxwich. Established at Whitford Burrows. Llanmorlais. East side of Langland Bay, *W. M. R.* 6. Porthcawl. 7. Barry Island, Llantwit Major.—b. *Lecoqii* (Lam.). 5. Port Talbot Docks. 6. Porthcawl. Llantwit Major to Llandow. — *P. hybridum* L. 8. Ballast at Cardiff, Penarth, &c., *Storrie*. — *R. Rhœas* L. Never looks native, though *Top. Bot.* does not question its status. 1. Pitton, Llangenydd, Llanmadoc, Cheriton to Llanrhidian, Port Eynon, Horton. Mumbles, *W. M. R.* 3. Near Crumlin Bog. Kilvey Hill, *Gutch*. 5. Port Talbot. 6. Porthcawl, Southerndown to Ogmore Castle. 7. Aberthin, Swanbridge. 8. Aberdare, Ynyshir, *Rhondda Fl.* Whitchurch, *Hb. Cardiff*. *Fl. pleno* at Llwydcoed. A form

going off towards *P. dubium* at Cardiff Docks. 9. Penylan, Coed-y-goras, &c., *Storrie*. — Var. *strigosum* (Boenn). 6. Porthcawl Sands. 8. Cardiff Docks. — *P. somniferum* L. a. *hispidum* H. C. Wats. 5. Port Talbot, Mawdlam. 7. Llantwit Major. 8. Cardiff Docks. Blaenrhondda, *Rhondda Fl.* — b. *glabrum* H. C. Wats. 3. Swansea, *Hb. Cardiff*. 6. Porthcawl.

Rœmeria violacea Medic. 8. Ballast, Penarth, *Storrie*.

Fumariaceæ.

Corydalis bulbosa DC. 2. Penllergaer, *Hb. Motley*.—*C. lutea* DC. 1. Oxwich, Parkmill. 6. Naturalized at Southerndown, *Storrie*. Llangewydd, *Cardiff Nat. Soc. Proc.* 1892.

Fumaria densiflora DC. 8. Llandaff, *Hb. Cardiff*. — *F. parviflora* Lam. 8. Ballast only, *Storrie*. The record in *Top. Bot. Supp.* 1905, should be removed. The plant is casual in the county.

Cruciferæ.

Alyssum alyssoides L. 8. Aberdare. Ballast, Penarth, &c., *Storrie*. — *A. incanum* L. 5. Port Talbot Docks. 8. Aberdare. Cardiff Docks. Penarth Docks, *Hb. Cardiff*.—*A. maritimum* Lam. 1. Horton. 3. Sandhills, Swansea, *Woods*. 5. Aberafan, *Hb. Motley*. 8. Abernant Park, Aberdare. Ballast, Cardiff and Penarth, *Storrie*.

Arabis verna Br. 8. Coedriglan, *Cardiff Nat. Soc. Proc.* 1882.

Armoracia rusticana G. M. & S. Casual and outcast. Records from all districts except No. 2.

Barbarea verna Asch. 8. Aberdare. Ballast at Cardiff and Penarth, *Storrie*.

Brassica adpressa Boiss. 8. Cardiff Docks. — *B. alba* Boiss. Nowhere native, I believe; though *Top. Bot.* does not query it. 1. Gowerton. Langland Bay, *W. M. R.* 2. Pantyffynon. 6. Southerndown, *Storrie*. 7. Barry Island. 8. Aberdare. Cardiff, *Hb. Cardiff*. Penarth, *Storrie*. — *B. Cheiranthus* Vill. 5. Port Talbot Docks. 6. Porthcawl. 8. Merthyr Tydfil, *Hb. Motley*. Introduced, cf. *Rep. B. E. C.* 1904. — *B. elongata* Ehrh. 5. Port Talbot Docks. 8. Aberdare.—*B. Napus* L. Probably very frequent as an escape, but not native. 3. Kilvey Hill, Swansea, *Gutch*. 6. S. Cornely. 7. Barry Island, Cadoxton. 8. Aberdare, Hirwaun, Peterston, Cardiff Docks. Llandaff, *Storrie*. 9. Pwllypant, *Hb. Cardiff*. — *B. Rapa* L. 1. Llanmadoc. 4. Glyn Neath. 5. Port Talbot. Aberafan, *Hb. Motley*. 8. Aberdare. Cardiff, *J. Bot.* 1884, p. 257. 9. Pwllypant, *Hb. Cardiff*.—Var. *Briggsii* H. C. Wats. 5. Port Talbot Docks. 8. Cardiff Docks.

Bunias Erucago L. 8. Cardiff Docks. — *B. orientalis* L. 8. Penarth Ferry, *Hb. Cardiff*. Near Copper Works, *Storrie*.

Camelina sativa Crantz. 2. Loughor. 5. Port Talbot Docks. 7. Cadoxton, Barry Island. 8. Aberdare. Cardiff, *Hb. Cardiff*. 9. Llanishen, *Hb. Cardiff*. — Var. *fœtida* (Fr.). 7. Barry Island. 8. Cardiff, *Storrie*.

Cheiranthus Cheiri L. 1. Penrice. Oxwich, *S. W. Jenkins*. 6. Ogmore Castle. Near Porthcawl, *Lloyd*. 7. Old Beaupré.

Cowbridge. Barry Castle, *D.* 8. Aberdare, Llandaff. Cardiff and Peterston, *Storrie.*—Var. *fruticulosus* Sm. 8. Aberdare.

Cochlearia (*Kernera*) *saxatilis* L. 8. Aberdare.

Conringia austriaca Sweet. 8. Aberdare. — *C. orientalis* Dum. 5. Port Talbot Docks. 8. Aberdare. Ballast at Cardiff and Penarth, *Storrie.*

Diplotaxis tenuifolia DC. Nowhere native, I believe, though treated as native in *Top. Bot.* 1. Gowerton to Penclawdd. 3. Rubbish near Crumlin Bog. Swansea, *Hb. Motley.* Llandwr, *Gutch.* Foxhole, *Flower.* 5. Port Talbot Docks. 6. Porthcawl to S. Cornely. 7. Barry and Barry Island. 8. Cardiff Docks. Penarth, *Storrie.* Rhondda Valley, *Rhondda Fl.*, which says it is common there; probably some error.

Erysimum cheiranthoides L. 6. Near Porthcawl, *Lloyd.* 8. Aberdare, Hirwaun, Cardiff Docks. — *E. repandum* L. 5. Port Talbot Docks. 8. Cardiff Docks.

Hesperis matronalis L. Outcast in districts 1, 3, 5, 6, 7, 8.

Iberis amara L. 5. Kenfig, *Hb. Motley.* 7. Cliffs near Swanbridge, *Cardiff Nat. Soc. Proc.* 1891–2. 8. Pontypridd, *Hb. Cardiff.* —*I. umbellata* L. 8. Penarth, *Hb. Cardiff.*

Lepidium Draba L. 3. Swansea, 1802, *Dillwyn.* 5. Port Talbot. 6. Sands, Porthcawl. 7. Barry, Cold Knap. 8. Aberdare. Cardiff Docks, *Storrie.* Penarth Ferry, *Hb. Cardiff.* Blaenrhondda to Porth, common, *Rhondda Fl.* — *L. graminifolium* L. 5. Port Talbot Docks. 8. Cardiff Docks. — *L. ruderale* L. 3. Swansea, ballast, *B. G.* 4. Neath, *Flower.* 5. Port Talbot Docks. 7. Barry. 8. Aberdare, Cardiff Docks, &c. Waste ground, Rhondda Valley, *Rhondda Fl.*—*L. sativum* L. 5. Port Talbot. 8. Aberdare. Penarth, Cardiff, &c., *Hb. Cardiff.* 9. Roath, *Storrie.*

Matthiola tricuspidata Br. 8. Ballast, Cardiff, *Storrie.*

Myagrum perfoliatum L. 8. Cardiff Docks.

Neslia paniculata Desv. 4. Jersey Marine.

Raphanus Raphanistrum L. 2. Penyrheol, Pantyffynon to Pontardulais. 3. Kilvey Hill, *Gutch.* 5. Port Talbot. 6. Porthcawl Sandhills. 7. Barry Island. 8. Rubbish and waste places, Aberdare. Cardiff, *Hb. Cardiff.* Llandaff, Whitchurch, &c., *Storrie.*—f. *lutea.* 5. Port Talbot Docks. 8. Cardiff Docks. — *R. sativus* L. 5. Port Talbot. 8. Aberdare.

Rapistrum perenne All. 5. Port Talbot Docks. 8. Cardiff Docks.—*R. rugosum* All. 5. Port Talbot Docks.

Sisymbrium altissimum L. 1. Killay, *G. C. D.* 2. Pontardulais. 5. Port Talbot Docks. 8. Aberdare, Cardiff Docks. Penarth, *Hb. Cardiff.*—*S. Irio* L. 3. Swansea, *R. Jackett.* 8. Ballast, Cardiff, *Storrie.*—*S. orientale* L. 2. Pontardulais. 3. Swansea, Ystalyfera. 6. Porthcawl. 8. Aberdare, Cardiff Docks. — *S. polyceratium* L. 8. Ballast, Cardiff, *Storrie.*

Thlaspi arvense L. 3. Roadside between Wych Tree Bridge and Llangyfelach, &c., *Gutch.* Rubbish by Crumlin Bog. 5. Port Talbot Docks. 6. Nottage, *J. Bot.* 1902, p. 316. 7. Barry Island, St. Hilary, *Cardiff Nat. Soc. Proc.* 1882. 8. Aberdare. Cardiff, occasionally, *Storrie.* 9. Roath Park, *Hb. Cardiff.*

Resedaceæ.

Reseda alba L. 3. Swansea, *Gutch*. 6. Porthcawl. 7. Below St. Hilary, *Storrie*. 8. Cardiff, on ballast, *Storrie*.

Caryophylleæ.

Dianthus Caryophyllus L. 8. Walls of Cardiff Castle, *B. G.* Extinct.

Gypsophila paniculata L. 8. Cardiff Docks.

Lychnis Githago Scop. Not native, in spite of record in *Top. Bot.* 1. Near Llangenydd. 5. Port Talbot. 7. Barry. Sully, *Storrie*. 8. Occasional at Aberdare. Cardiff, *Cardiff Nat. Soc. Proc.* 1873. Penarth, *Storrie*.

Minuartia tenuifolia Hiern. 6. Near Porthcawl, *Lloyd*. 8. Peterston, by the railway. Ballast, Cardiff, *Storrie*.

Saponaria officinalis L. 1. Rhosili, Blue Anchor. 2. Penllergaer, river-bed gravel of the Upper Loughor. 3. Sketty Burrows, established from 1805 at least. Ystalyfera. 4. Glyn Neath, Jersey Marine, Resolven. 6. Near Merthyr Mawr. 8. Frequent. 9. Hengoed. Rhymney Valley, frequent, *Storrie*. — Var. *puberula* Wierzl. 6. Merthyr Mawr, *J. Bot.* 1902, p. 316. — *S. Vaccaria* L. 5. Port Talbot. 8. Hirwaun Common, *B. A. Williams*. Aberdare. Cardiff and Penarth Docks, *Storrie*.

Silene Armeria L. 5. Cwm Bychan (*i. e.* Cwmafan), *Hb. Motley*. —*S. conica* L. 5. Port Talbot Docks. 8. Cardiff and Penarth, ballast, *Storrie*.—*S. dichotoma* Ehrh. 6. Porthcawl. 8. Aberdare, Cardiff Docks. — *S. Otites* Wibel. 8. Ballast, Cardiff, *Storrie*.—*S. quinquevulnera* L. 2. Pontardulais, by railway, *Hb. Motley*.

Portulaceæ.

Claytonia perfoliata Donn. 8. Cardiff, *Storrie*. — *C. sibirica* L. 8. Penarth, *Hb. Cardiff*.

Tamariscineæ.

Tamarix gallica L. 1. Mumbles, *Lloyd*. 5. Porthcawl, *Phyt.* ii. 972. 6. Southerndown. 7. Swanbridge. Cowbridge, *W. M. R.* 8. Penarth.

Hypericineæ.

Hypericum calycinum L. 1. Nicholaston Wood, *Flower*. 6. Near Porthcawl, *Lloyd*. 7. Barry, *D.* 8. Pentyrch and neighbourhood, *Storrie*.—*H. elatum* Ait. 7. Sully, *Storrie*.

Malvaceæ.

Althæa hirsuta L. 8. Hirwaun. E. Moors, *Hb. Cardiff*.

Lavatera punctata All. 8. E. Moors, *Hb. Cardiff*.

Malva borealis Wallm. 8. Aberdare. — *M. nicæensis* All. 8. Cardiff, *Hb. Cardiff*.

Sida spinosa L. 8. Cardiff, *Storrie*.

Tiliaceæ.

Tilia vulgaris Heyne. Often planted.

Lineæ.

Linum usitatissimum L. 1. Langland Bay, *W. M. R.* 3. Common about Swansea, *Gutch*. 5. Port Talbot. 7. Barry. 8. Aberdare, Cardiff Docks. Penarth, &c., *Storrie*.

Zygophyllaceæ.

Tribulus terrestris L. 8. Cardiff, *Hb. Cardiff*.

Geraniaceæ.

Geranium phæum L. 6. Merthyr Mawr, *Hb. Cardiff*. 8. Hirwaun. Cooper's Fields and Coedriglan, *Storrie*.—*G. sylvaticum* L. 5. Margam, *Hb. Motley*. 7. Cwrtyrala and near Llanmaes, *Storrie*. 8. Coedriglan, *Storrie*.—*G. versicolor* L. 5. Baglan, *Mrs. Llewellyn*! 8. Cooper's Fields, *Storrie*.

Impatiens biflora Walt. 7. Llandough, near Cowbridge.—*I. Noli-tangere* L. 3. Swansea neighbourhood, *Swansea Sci. Soc. Proc.* 1891–2. Probable error. —*I. parviflora* DC. 2. Gravel of R. Loughor below Pantyffynon.—*I. Roylei* Walp. 6. Merthyr Mawr. 8. Secluded part of Peterston Moor.

Limnanthes Douglasii Br. 8. Penarth, *Hb. Cardiff*.

Oxalis corniculata L. (*stricta* auct. Angl.). 1. Port Eynon, *D.* 6. Southerndown, *Storrie*. 7. Barry House. Sutton, *Storrie*. 8. Aberdare, Cardiff Docks. Coedriglan and Penarth, *Storrie*.

Celastrineæ.

Staphylea pinnata L. 8. Castell Coch, *Cardiff Nat. Soc. Proc.* 1873.

Sapindaceæ.

Acer Pseudoplatanus L. Frequently planted; seeding and propagating itself very freely. Often occurring in the middle of old woods.

Leguminosæ.

Arthrolobium pinnatum Rendle & Britten. 8. Ballast, Cardiff, *Storrie*.

Astragalus hamosus L. 8. E. Moors, Cardiff, *Hb. Cardiff*.

Cicer arietinum L. 8. Cardiff, *Hb. Cardiff*.

Coronilla scorpioides Koch. 5. Port Talbot. 8. E. Moors, Cardiff, *Hb. Cardiff*. Aberdare. — *C. varia* L. 5. Port Talbot. 8. Railway near Aberdare, *B. A. Williams*! Castell Coch, *Hb. H. F. Parsons*. Radyr, *Miss F. M. Williams*! Penarth, *Hb. Cardiff*. Cogan and E. Moors, *Storrie*. 9. Cefn Mably, *Hb. Cardiff*.

Hedysarum coronarium L. 8. Cardiff, *Hb. Cardiff*.

Laburnum anagyroides Medic. 8. Self-sown at Llwydcoed.

Lathyrus Aphaca L. 5. Port Talbot Docks. 6. Porthcawl, *J. Bot.* 1902, p. 316. 7. Cowbridge, *Storrie*. Railway-cutting by St. Mary Church Road, *W. F. Evans*. 8. Ballast and waste ground, E. Moors, Grangetown, Penarth, Llantrissant, *Storrie*. Aberdare, Cardiff Docks.—*L. tuberosus* L. 8. Cardiff Docks.

Medicago denticulata Willd. 5. Port Talbot Docks. 8. Aberdare, Hirwaun, Taffs Well, Cardiff. E. Moors and Penarth Docks,

Hb. Cardiff.—Var. *apiculata* Willd. 8. E. Moors, *Hb. Cardiff.*—Var. *lappacea* Desv. 5. Port Talbot Docks. — *M. Falcata* L. 1. Near Port Eynon, *E. Forster* in *B. G.*; the specimen "floribus purpureis" is in Hb. Brit. Mus., and may be *M. sylvatica*. 3. Swansea Docks, Sketty Burrows, &c. 5. Aberafan, Port Talbot Docks. 6. Porthcawl. 8. Penarth Ferry, *Hb. Cardiff.* E. Moors, *Storrie.* — *M. sativa* L. 1. Langland Bay, *W. M. R.* 3. Kilvey Hill, *Gutch.* 5. Port Talbot Docks. 6. Porthcawl, Merthyr Mawr. 7. Barry Island. 8. Aberdare. Railway-banks in Rhondda Valley, *Rhondda Fl.* Cardiff Docks, &c. — *M. tribuloides* Desv., *M. marina* L. 8. E. Moors, *Hb. Cardiff.*

Melilotus alba Desv. 3. Ballast, Swansea, *Flower.* 5. Port Talbot. 7. Barry. 8. Aberdare. Hirwaun, *B. A. Williams.* Ballast, Cardiff, *Storrie.* — *M. indica* All. 5. Port Talbot Docks. 7. Barry. 8. Aberdare. Penarth Ferry, *Cardiff Nat. Soc. Proc.* 1891–2.

Ononis Natrix L. 8. Shrimphouse, Cardiff, *Hb. Cardiff.*

Pisum arvense L. 3. Crumlin Burrows. 5. Port Talbot. 8. Aberdare.

Scorpiurus subvillosus L. 8. E. Moors, Penarth, *Hb. Cardiff.*

Securigera Coronilla DC. 8. Penarth, *Hb. Cardiff.*

Trifolium hybridum L. 1. Penrice. Langland and Caswell Bays, *W. M. R.* 2. Pontardulais. 3. Crumlin Burrows. 5. Mawdlam. Port Talbot Docks. 7. Cowbridge. 8. Aberdare. Cardiff Docks.—Var. *elegans* Savi. 5. Port Talbot. 7. Barry.—*T. incarnatum* L. 7. Barry, *D.*! Near Cowbridge, &c., *Storrie.* 8. Aberdare. Ballast, Cardiff, *Cardiff Nat. Soc. Proc.* 1876.—*T. lappaceum* L. 8. Aberdare.—*T. ochroleucon* Huds. 8. Cardiff, *Storrie.*—*T. pannonicum* Jacq. 8. Penarth, *Storrie.*—*T. resupinatum* L. 8. Hirwaun, Cardiff Docks. — *T. stellatum* L. 5. Port Talbot Docks. 8. Penarth Ferry, *Hb. Cardiff.* Cardiff, *Storrie.*—*T. subterraneum* L. 8. Ballast, Cardiff, *Storrie.* — *T. suffocatum* L. 7. Whitmore Bay, Barry, *Storrie.* 8. Penarth, *Hb. Cardiff.*

Trigonella cærulea Ser. 5. Port Talbot. 8. Aberdare. E. Moors, Cardiff, *Hb. Cardiff.*

Vicia Faba L. 5. Port Talbot. 8. Aberdare, Porth.—*V. gracilis* Loisel. 6. Tondu and Maesteg, *Storrie.* 8. Ballast at Cardiff, *Storrie.*—*V. hybrida* L. Dr. Hooker has a Glamorgan specimen in *Hb. Oxon*, fide *G. C. D.* — *V. lutea* L. 8. Aberdare. Ynyshir, *Rhondda Fl.* Cardiff, *Storrie.* — *V. pannonica* Crantz. 8. Near Aberdare.—*V. sativa* L. In every district, and probably common as an introduction.—*V. villosa* Roth. 5. Port Talbot. 8. Cardiff Docks.—Var. *glabrescens* Koch. 5. Port Talbot Docks. 7. Barry. 8. Ballast, Penarth, *Hb. Cardiff.* Cardiff Docks. Aberdare.

Rosaceæ.

Cotoneaster microphylla Wall. 6. Old limestone quarry, S. Cornely, 1904, far from houses. *J. Bot.* 1905, pp. 244, 274, adds a few more localities.

Fragaria chiloensis Duchesne. 8. Penarth Dock.

Mespilus germanica L. 6. Ewenny, and 8. Radyr, *Storrie*. Planted.

Potentilla fruticosa L. 8. Castell Coch Woods, *Storrie*.—*P. norvegica* L. 7. Sully.

Poterium polygamum Waldst. & Kit. 5. Port Talbot Docks.

Pyrus rotundifolia Bechst. 7. Llancarfan.

Saxifrageæ.

Ribes Grossularia L. Frequent as an escape.

Saxifraga umbrosa L. 9. Railway-cutting, Hengoed, *Cardiff Nat. Soc. Proc.* 1891–2.

Crassulaceæ.

Sedum album L. 1. Llanmadoc. 5. Mawdlam. 7. St. Hilary, *Cardiff Nat. Soc. Proc.* 1882.—*S. dasyphyllum* L. 1. Oxwich, Port Eynon, Horton, Llanmadoc. — *S. hybridum* L. 1. Llanmadoc.—*S. reflexum* L. 1. Frequent. 2. Loughor. Penllergaer, *Swansea Sci. Soc. Proc.* 1895–6. 3. Swansea, *Gutch*. Ystalyfera. 8. Peterston Castle and St-y-Nyll, *Storrie*. — Var. *albescens* (Haw.). 3. Ystalyfera. — *S. rupestre* L. 1. Wall at Pwlldu. 7. St. Mary Church, *Cardiff Nat. Soc. Proc.* 1882.

Sempervivum tectorum L. 6. Porthcawl, *Lloyd*. 7. Barry, Cadoxton, &c., *Storrie*. 8. Aberdare. St. Nicholas, *Storrie*. Tylacoch, *Rhondda Fl.*

Lythrarieæ.

Lythrum Hyssopifolia L. 8. Penarth, &c., *Hb. Cardiff*.

Onagrarieæ.

Clarkia pulchella Pursh. 8. Penarth, *Hb. Cardiff*.

Œnothera biennis L. Frequent; no record from 9.—*Œ. muricata* L. 5. Port Talbot.— *Œ. odorata* Jacq. 5. Port Talbot. 6. Porthcawl, *J. Bot.* 1902, p. 316. 8. Cardiff Docks.

Cucurbitaceæ.

Ecballium Elaterium A. Rich. 8. Roath Dock, *Hb. Cardiff*.

Umbelliferæ.

Ammi majus L. 8. Aberdare.

Bupleurum rotundifolium L. 8. Aberdare, Cardiff Docks.

Carum Carvi L. 3. Crumlin Bog. 5. Port Talbot. 6. Porthcawl, *Lloyd*. 8. Aberdare. Cardiff. — *C. Petroselinum* Benth. & Hook. fil. Records from all except 4 and 9.

Caucalis daucoides L. 8. Aberdare. — *C. latifolia* L. 5. Port Talbot. 8. Aberdare, Cardiff.

Coriandrum sativum L. 8. Grangetown, *Storrie*. Aberdare.

Scandix Pecten-Veneris L. 3. Swansea, *Flower & Lees*. 5. Port Talbot. 6. Porthcawl, *Lloyd*. 7. Barry, St. Athan's, Llantwit, &c., *Storrie*. 8. Cardiff, *J. Bot.* 1884, p. 257. Grangetown, *Storrie*. "Native" in *Top. Bot.*

Caprifoliaceæ.

Lonicera Caprifolium L. 6. Newton, *Lloyd*.

Sambucus Ebulus L. 1. Llanmorlais, *E. F. L.* 3. Swansea, *Moggridge*. 4. Neath, &c., *Dillwyn*. 6. Pwll Cawl, *Hb. Motley*. Llandow, Newton. St. Bride's Major and Maesteg isaf, *Storrie*. 7. Monknash, St. Athan's Road. 8. Aberdare. Cogan Pill, &c., Penarth Dock, *Storrie*.

Symphoricarpos racemosus Michx. 2. Loughor, Gowerton. 3. Ystalyfera. 7. Llandough, Cowbridge. 8. Aberdare, Merthyr Tydfil, Ystradowen.

Rubiaceæ.

Asperula arvensis L. 5. Port Talbot Docks. 8. Aberdare.

Galium tricorne Stokes. 3. Swansea Docks. 5. Port Talbot. 7. Merthyr Dyfan, Ystradowen. Barry Island, *Woods*. 8. Aberdare.

Valerianaceæ.

Kentranthus ruber DC. 1. Common. 3. Swansea. 6. Newton, Southerndown. 7. Sully, Llantwit Major. Beaupré, *Cardiff Nat. Soc. Proc.* 1882. Flat Holme, *J. Bot.* 1891, p. 345. 8. Aberdare, Penarth. Cardiff, *Storrie*. Treorchy, *Rhondda Fl.*

Valerianella discoidea Loisel. 8. Aberdare.

Compositæ.

Achillea cretica L. 8. Penarth, *Storrie*.—*A. nobilis* L. 5. Port Talbot Docks.

Ambrosia maritima L. 5. Port Talbot Docks. 8. Penarth, *Hb. Cardiff*.

Anacyclus clavatus Pers., *A. radiatus* Loisel. 8. Cardiff Docks.

Antennaria margaritacea Brown. 1. Gowerton. 2. Gowerton, Pantyffynon. Llangyfelach, *Hb. Motley*. 3. Ystalyfera, spreading to inaccessible cliffs. Clydach, &c., *Flower*. 4. Hirwaun, Rhigos. Neath Abbey, *B.G.* Pontneddfechan, *Woods*. 5. Kenfig Sands, *J. Bot.*, 1902, p. 249. 8, 9. Very common. On bare rock, Graig Fawr, Treorchy, at 1500 ft.

Anthemis arvensis L. 3. Swansea, *Gutch*. Crumlin Burrows. 5. Port Talbot Docks. 8. Aberdare. Ballast, Cardiff, *Storrie*. Not native, I believe.

Artemisia campestris L. 8. Bute Docks, *Hb. Cardiff*.

Aster salignus Willd. 1. Cheriton. 5. Port Talbot. 8. Established Cynonside above Aberdare, Cwmbach.—*A. paniculatus* Lam. 6. Merthyr Mawr.

Calendula officinalis L. 3. Swansea, *Woods*. 5. Port Talbot. 8. Aberdare.

Carthamus lanatus L. 5. Port Talbot Docks.

Centaurea aspera L. 8. Ballast, Cardiff, *Storrie*.—*C. Calcitrapa* L. 5. Port Talbot. 8. Cardiff Docks. Penarth, Leckwith, &c., *Storrie*. Not native. — *C. Cyanus* L. 1. Gowerton. 5. Port Talbot. 6. Pencoed, Bridgend, *Storrie*. 7. Barry, *D*. 8. Aberdare, Mountain Ash, Cardiff Docks. Not native.—*C. diluta* Ait. 5. Port Talbot Docks.—*C. melitensis* L. 1. Paviland. 5. Port

Talbot Docks. 8. E. Moors, *Hb. Cardiff.* Aberdare.—*C. montana* L. 8. Aberdare.—*C. solstitialis* L. 8. E. Moors, *Hb. Cardiff.*—Var. *Adami* W. 8. Aberdare.

Chrysanthemum coronarium L. 8. Aberdare.—*C. segetum* L. Not native; only occasional. No record for 6 and 9.

Crepis taraxacifolia Thuill. 3. Crumlin Burrows, Swansea. 7. Cadoxton, Barry, Porthkerry, Fontigary, Aberthaw. 8. Pentyrch; Forest Wood, Ystradowen; Lavernock, Cardiff Docks, Aberdare.

Cryptostemma calendulaceum Br. 8. Cardiff, *Storrie.*

Doronicum Pardalianches L. 6. Bridgend, *Storrie.*

Erigeron canadensis L. 4. Neath, *B.G.* 5. Port Talbot Docks. Kenfig Sandhills. 8. Cardiff Docks.

Galinsoga parviflora Cav. 5. Port Talbot. 8. Penarth, *Hb. Cardiff.*

Gnaphalium luteo-album L. 8. Shrimphouse, *Hb. Cardiff.*

Grindelia squarrosa Dunal. 8. Penarth Ferry, *Storrie.*

Guizotia abyssinica Cass. 8. Aberdare.

Helianthus annuus L. 8. Llwydcoed.—*H. rigidus* Desf. 8. Aberdare.—*H. tuberosus* L. 5. Port Talbot Docks.

Hieracium aurantiacum L. 4. Glyn Neath, *J. Bot.* 1892, p. 296. 5. Graig Ymroch, *Hb. Motley.* 6. Coity, *Hb. Cardiff.* 8. Green Meadow, *Storrie.* 9. Lisvane, *Hb. Cardiff.* Coedygoras, Near Caerphilly Tunnel, *Storrie.*

Inula Helenium L. 1. Frequent. 2. Gowerton, Penllergaer, *Gutch.* 3. Glanbrane, Cwm Crumlin, *Gutch.* 4. Pontneddfechan, *Gutch.* 6. Bridgend, Maesteg, *Storrie.* Nottage, *J. Bot.* 1902, p. 316. 7. Nash Point. Sully, *Woods.* Michaelstone le Pit, *Cardiff Nat. Soc. Proc.* 1873, Barry Island, *do.* 1867. 8. Penarth, Leckwith, *Storrie.*—*I. viscosa* Ait. 8. E. Moors, Cardiff, *Storrie.*

Lactuca Serriola L. 8. Cardiff.

Matricaria Chamomilla L. 1. Gower, casual, *J. Bot.* 1892, p. 296 2. Gowerton, Penllergaer. 5. Port Talbot, Mawdlam. 7. Barry St. Hilary, *Cardiff Nat. Soc. Proc.* 1882. 8. Aberdare, Cardiff Docks, Grangetown. Blaenrhondda, *Rhondda Fl.* 9. Roath, Pengam marshes.—*M. suaveolens* Buchen. 3. Ystalyfera. 4. Neath. Aberdylais, *Ley.* 5. Port Talbot. 6. Porthcawl. 7. Cowbridge, Swanbridge, Lavernock. 8. Aberdare, Hirwaun. Cardiff, very frequent. 9. Roath.—*M. Parthenium* L. Nowhere native, I believe, but frequently occurring.

Petasites fragrans Presl. 1. Swansea, Nicholaston, Oxwich. Langland Bay, *W. M. R.* 3. Mumbles Road. 5. Port Talbot to Pyle. 6. Porthcawl sands. 7, 8. Rather frequent.

Scolymus hispanicus L. 8. Cardiff Docks.

Senecio crassifolius Willd. 8. Cardiff Docks.—*S. squalidus* L. 5. Port Talbot Docks. 8. Cardiff Docks, &c.—*S. vernalis* Waldst. and Kit. 8. Cardiff Docks.

Silybum Marianum Gaertn. 5. Aberafan. 7. Shore under Cliffs, Fontigary. Dinas Powys, *Storrie.* Barry Island, *Cardiff Nat. Soc. Proc.* 1867. 8. E. Moors, *Storrie.*

Tanacetum vulgare L. A frequent escape in Glamorgan, but, I believe, not native.

Tragopogon porrifolius L. 2. Loughor, *Hb. Motley*. 6. Maesteg, *Storrie*.

Xanthium Strumarium L. 8. Bute Docks, *Storrie*.—*X. spinosum* L. 5. Port Talbot. 8. E. Moors, *Hb. Cardiff*.

Campanulaceæ.

Legousia hybrida Delarbre. 6. Near Porthcawl, *Lloyd*. 7. Cowbridge, *Storrie*.

Phyteuma orbiculare L. 7. Cowbridge, *Storrie*.

Primulaceæ.

Anagallis cærulea Schreb. 2. Penllergaer, *Gutch*. 5. Kenfig, *Hb. Motley*. Port Talbot Docks. 6. Porthcawl, *Lloyd*. 8. Cardiff. Lavernock, *Storrie*.

Cyclamen hederifolium Ait. 8. Coedriglan, *Storrie*.

Apocynaceæ.

Vinca major L. Occasional: records from 1, 4, 6, 7, 8. *V. minor* L. 1. Parkmill. 7. Marcross. Cwrtyrala, St. Athan's, Swanbridge, *Storrie*. 8. Aberdare. Cardiff, *J. Bot.* 1884, p. 257.

Polemoniaceæ.

Gilia capitata Sims. 8. Ballast, Cardiff, &c., *Storrie*.

Polemonium cæruleum L. 8. Aberdare. Great Heath, *Storrie*.

Boragineæ.

Amsinckia lycopsioides Lehm. 5. Port Talbot. 8. Aberdare.

Anchusa italica Retz. 8. Aberdare.—*A. officinalis* L. 6. Porthcawl, *J. Bot.* 1902, p, 317.

Asperugo procumbens L. 8. Aberdare. Cardiff, *Storrie*.

Borago officinalis L. Escape. No record for 2.

Cynoglossum montanum L. 8. Near the Red House, *Storrie*.

Echinospermum Lappula Lehm. 5. Port Talbot. 8. Aberdare. Cardiff, *Hb. Cardiff*.

Echium violaceum L. Ballast, Cardiff, *Storrie*.

Heliotropium europæum L. 5. Porthcawl, *J. Bot.* 1902, p. 317. 8. Cardiff, *Hb. Cardiff*.

Lithospermum arvense L. 1. Rhosili. Bishopstone, *Swansea Sci. Soc. Proc.* 1894–5. 5. Port Talbot. 8. Aberdare, Hirwaun. Cardiff and Penarth, *Storrie*.

Myosotis sylvatica Hoffm. 1. Cheriton. 6. Merthyr Mawr. 8. Aberdare. Coedriglan, *Storrie*. Bodringallt Woods, *Rhondda Fl.*

Omphalodes verna Moench. 1. Penrice, *Dillwyn*.

Pulmonaria officinalis L. 4 & 5. Neath to Pyle, *B. G.* 6. Dunraven, and 7. Wenvoe, *Storrie*. 8. Coedriglan, *D. T. R. James*!—*P. angustifolia* L. 3. Near Swansea, *Swansea Sci. Soc. Proc.* 1891–2.

Symphytum peregrinum Ledeb. 1. Penard, *G. C. D.* 5. Mawdlam, Port Talbot. 6. Bridgend. 7. Cadoxton, Cowbridge. 8. Aberdare, Llandaff.

Solanaceæ.

Datura Stramonium L. 1. Whiteford Burrows, Llangenydd. 3. Swansea, *B.G.* 5. Port Talbot. 7. Aberthin. Cowbridge, *Cardiff Nat. Soc. Proc.* 1873. 8. E. Moors, *Storrie.*

Hyoscyamus albus L. 8. Shrimphouse, *Storrie.*

Lycium chinense Miller. 1. Penard to Killay, *G. C. D.* 5. Port Talbot. 6. Porthcawl. 7. Swanbridge. 8. Cardiff Docks, Ystradowen.

Lycopersicum esculentum Mill. 5. Port Talbot. 8. Aberdare, Cardiff Docks. Frequent outcast.

Scrophularineæ.

Antirrhinum majus L. 6. Porthcawl, *Lloyd.* 7. St. Andrew's, Llantwit Major, &c., *Storrie.* 8. Cardiff, Llandaff, Taffs Well. Penarth Ferry, *Hb. Cardiff.*

Linaria cæsia DC., *L. supina* Desf., *L. Pelisseriana* Mill. 8. Ballast, Cardiff, *Storrie.*—*L. Cymbalaria* Mill. Common: no record for 9.—*L. purpurea* Mill. 3. Swansea, *Gutch.* 8. Ballast, Cardiff, *Storrie.*

Mimulus Langsdorffii Donn. 2. Common by R. Loughor. 5. Baglan, *R. G. Llewellyn*! 7. Cowbridge. 8. Dunraven Station and Ystradrhondda, *Rhondda Fl.* 9. Caerphilly Common, *Storrie.*

Scrophularia Scorodonia L. 6. Porthcawl, *J. Bot.* 1902, p. 317. 8. Cardiff, *Storrie.*—*S. canina* L. var. *pinnatifida* Brot. 8. Cardiff, *Hb. Cardiff.*

Verbascum austriacum Schrad. 8. Aberdare. — *V. Blattaria* L. 1. Newton, *Flower.* 3. Swansea, *Hb. Br. Mus.* Singleton Marsh, &c., *Gutch.* 4. Neath Abbey, *Gutch.* 5. Mawdlam, *J. Bot.* 1902, p. 317. Aberafan. Taibach, Margam and Kenfig, *Gutch.* 6. Near Pyle, &c., *Gutch.* 8. St. Fagan's, *Storrie.* Llandaff, *Cardiff Nat. Soc. Proc.* 1873. — *V. Lychnitis* L. 8. Ballast, Cardiff, *Storrie.*—*V. virgatum* Stokes. 8. Cardiff, *N. B. G.* Mr. Moggridge sowed the plant in several places in the county.

Veronica Buxbaumii Tenore. Common.

Labiatæ.

Lamium maculatum L. 1. Killay to Penard, *G. C. D.* 6. Pencoed, *Storrie.* 7. Ystradowen. Bonvilstone, Llantwit Major, *Storrie.* 8. Aberdare, Hirwaun. Penarth, Lavernock, *Storrie.*

Leonurus Cardiaca L. 5. Pyle and Kenfig, *Hb. Motley.* 6. S. Cornely, Mawdlam. 7. Aberthin. St. Hilary, *Storrie.*

Melissa officinalis L. 1. Pwlldu, Parkmill, Llanmadoc, Llanrhidian. 2. Loughor. 6. Cadoxton. 7. St. Athan's Road. 8. Cardiff, *N. B. G.*

Melittis Melissophyllum L. 3. About Swansea, *Dillwyn.* 8. Ballast, Cardiff, *Storrie.*

Mentha spicata L. 1. Parkmill. 5. Mawdlam. 6. Nottage. Bridgend, &c., *Storrie.* 7. Cowbridge, *Hb. York Mus.* 8. Aberdare, Hirwaun. Cardiff, *Storrie.* Penrhys Brook, *Rhondda Fl.* —Var. *crispa* Hook. 8. Aberdare. — *M. Requienii* Benth. 2. Penllergaer.

Salvia argentea L. 5. Port Talbot Docks. — *S. pratensis* L. 6. Merthyr Mawr.—*S. verticillata* L. 5. Port Talbot. 6. Porthcawl, *J. Bot.* 1902, p. 317. 7. St. Athan's Road. 8. Aberdare. Cardiff, *Hb. Cardiff.* 9. Llanishen.—*S. sylvestris* L. 6. Porthcawl.

Satureia hortensis L. 8. Aberdare.

Sideritis montana L. 5. Port Talbot. 8. Penarth, *Hb. Cardiff.*

Stachys italica Mill. 8. Cardiff, *Hb. Cardiff.*

Teucrium Chamædrys L. 6. S. Cornely. 8. Penyrheolgerig, *Cardiff Nat. Soc. Proc.* 1891–2.

Plantagineæ.

Plantago arenaria Waldst. & Kit. 8. Penarth, *Hb. Babington.* Aberdare. E. Moors, *Hb. Cardiff.*

Illecebraceæ.

Herniaria glabra L. 1. Worms Head, error, *Dillwyn.* 8. Ballast, Cardiff, *Storrie.* — *H. ciliata* Bab. 8. Ballast, Cardiff, *Storrie.*—*H. hirsuta* L. 8. E. Moors, *Hb. Cardiff.*

Scleranthus annuus L. 5. Port Talbot, Aberafan. 7. Barry, *D.* 8. Hirwaun, Aberdare. Cardiff, *Hb. Cardiff.* Penrhys Road, &c., *Rhondda Fl.*—*S. perennis* L. 8. Cardiff Docks, *Storrie.*

Amaranthaceæ.

Amaranthus retroflexus L. 5. Port Talbot Docks. 8. Aberdare. Cardiff, *Hb. Cardiff.* — *A. deflexus* L. 5. Port Talbot Docks.—*A. Blitum* L. 5. Port Talbot Docks. 7. Barry, *Storrie.* 8. Cardiff, Penarth, *Storrie.*—*A. chlorostachys* Willd. 8. Cardiff, *Hb. Cardiff.*—*A. albus* L. 5. Port Talbot Docks.

Chenopodiaceæ.

Atriplex pedunculata L. 5. Aberafan, *Hb. Motley.*

Chenopodium polyspermum L. 5. Port Talbot Docks. 8. About Cardiff and Penarth, *Storrie.* Ystrad, *Rhondda Fl.*—*C. opulifolium* Schrad.. 5. Port Talbot Docks.—*C. serotinum* L. 5. Port Talbot Docks. 8. Hirwaun, Aberdare. Cardiff, *Storrie.* — *C. murale* L. 5. Port Talbot Docks. 8. Aberdare, Cardiff, *Storrie.*—*C. hybridum* L., *C. urbicum* L. 8. Ballast, Cardiff, *Storrie.* — *C. glaucum* L. 3. Swansea, *Gutch.* 5. Port Talbot Docks. 8. Penarth, *Storrie.* Not native.—*C. ambrosioides* L. 8. Cardiff, *Hb. Cardiff.*

Roubieva multifida Moq. 8. Cardiff, *Storrie.*

Suæda altissima Pall. 5. Port Talbot Docks.

Polygonaceæ.

Fagopyrum esculentum Moench. 5. Port Talbot Docks. 8. Aberdare, Hirwaun. Cardiff, *Storrie.*

Polygonum Bellardi All. 5. Port Talbot.—*P. cuspidatum* Sieb. & Zucc. Frequent escape; no record from 7.

Rumex scutatus L. 6. Cornely, *Gutch.*

Aristolochiaceæ.

Asarum europæum L. 8. Cardiff Castle, *Storrie.*

Thymelæaceæ.

Daphne Mezereum L. 8. Fairwater and St. Fagan's, *Storrie.*

Elæagnaceæ.

Hippophae Rhamnoides L. 8. Penarth.

Santalaceæ.

Thesium humifusum DC. 8. Newly broken ground at Cwrt-y-fil, *Storrie.*

Euphorbiaceæ.

Buxus sempervirens L. Frequent, but never native.

Euphorbia Esula L. 8. Cardiff Docks.—*E. Cyparissias* L. 1. Nicholaston Wood, *Gutch.* 5. Aberafan. 7. The Leys, *Cardiff Nat. Soc. Proc.* 1882. 8. Cardiff to Pontypridd, *Gutch.* Ballast, Cardiff, *Storrie.*

Mercurialis annua L. 1. Penard Castle, *Gutch.* Penmaen, *Swansea Sci. Soc. Proc.* 1893. 5. Port Talbot Docks. 6. Porthcawl. 7. Old Beaupré, St. Donat's. Barry, *D.* 8. Cardiff, *N. B. G.* —Var. *ambigua* (L.). 5. Port Talbot Docks.

Urticaceæ.

Cannabis sativa L. 3. Swansea, *J. Bot.* 1886, p. 112. 8. Aberdare. Penarth Ferry, *Hb. Cardiff.*

Urtica pilulifera L. 5. Kenfig, *Dillwyn.* 8. Ballast, Cardiff and Penarth, *Storrie.*

Cupuliferæ.

Carpinus Betulus L. 1. Killay to Penard, *G. C. D.* 4. Neath, *W. M. R.* 7. Wenvoe, Cadoxton. 8. Aberdare. Llaniltern, *Hb. Cardiff.* 9. Roath, Llanishen, &c., *Storrie.*

Castanea sativa Mill. 1. Killay to Penard, *G. C. D.* 4. Neddfechan Glen. 6. Merthyr Mawr, Llandow. 7. Wenvoe. 8. Aberdare. 9. Llanishen. Penylan, *Storrie.*

Juglans regia L. 7. St. Athan's.

Quercus Ilex L. 6. Wood at mouth of R. Ogmore. — *Q. Cerris* L. 4. Aberdylais, *Gutch.* 6. Wood at mouth of R. Ogmore. 8. Aberdare.

Salicineæ.

Populus alba L. and *P. canescens* Sm. A frequent escape, or introduction. — *P. balsamifera* L. 2. Pontardulais. 6. Newton. 8. Aberdare. Greenmeadow, *Storrie.* — *P. nigra* L. Not very frequent; no records for 4 and 9.

Salix pentandra L. 8. Aberdare. St. George's, St. Fagan's, Peterston, &c., *Storrie.*—*S. nigricans* Sm. 8. Aberdare. 9. Llanishen, *Storrie.*

Coniferæ.

Larix europæa DC. 6. Wood, Merthyr Mawr, *et sæpe.*

Pinus Pinaster Ait. 1. Black Pill. Fairwood Common, *G. C. D.*

Hydrocharideæ.

Elodea canadensis Michx. 4. Glyn Neath. 6. Ewenny. 8. Frequent about Cardiff, *Storrie*.

Irideæ.

Iris xiphioides Ehrh. 2. Penllergaer, *Dillwyn*.
Sisyrinchium angustifolium Mill. 8. Cardiff.

Amaryllidaceæ.

Leucojum æstivum L. 5. Kenfig, *Hb. Motley*. 7. Porthkerry Woods, *Storrie*.

Narcissus incomparabilis Mill. 5. Margam, *Dillwyn*. 6. Pencoed and Coed Mwstwr, *Storrie*. — *N. biflorus* Curtis. 1. Penrice. 5. Mawdlam. 8. R. Ely side, *Storrie*. Penarth, *Cardiff Nat. Soc. Proc.* 1893. — *N. poeticus* L. 1. Penrice, *Dillwyn*. 7. St. Hilary, *Cardiff Nat. Soc. Proc.* 1893. 9. Llanishen, *Storrie*. — *N. Tazetta* L. 8. Penarth, *Hb. Cardiff*.

Liliaceæ.

Allium Ampeloprasum L. 7. Porthkerry. Flat Holme, *Hb. Br. Mus.*—*A. Schœnoprasum* L. 8. Aberdare.

Colchicum autumnale L. 6. Newton, *J. Bot.* 1902, p. 317. 7. Wenvoe, *Cardiff Nat. Soc. Proc.* 1882. Boverton and Cardiff, *Storrie*.

Ornithogalum umbellatum L. 6. Porthcawl, *Lloyd*. Dunraven, *Hb. Cardiff*. Llynfi Valley, *Storrie*. 8. Cardiff, St. Fagan's, Pontypridd, *Storrie*.—*O. pyrenaicum* L. 7. Porthkerry Woods, *Storrie*.

Juncaceæ.

Juncus tenuis Willd. 8. Aberdare, Taffs Well.

Cyperaceæ.

Cyperus longus L. 8. Roath Ponds, introduced.

Gramineæ.

Alopecurus utriculatus Russ. 8. Ballast, Cardiff, *Hb. Cardiff*.
Anthoxanthum Puelii Lecoq & Lamotte. 8. Aberdare.
Apera Spica-venti Beauv. 3. Kilvey Hill, *Gutch*. 5. Port Talbot. 8. Cardiff, Aberdare. — *A. interrupta* Beauv. 8. Cardiff, *Storrie*.

Avena fatua L. a. *pilosissima*. 3. Crumlin Burrows. 5. Port Talbot. Graigafan, *Hb. Motley*. 7. Barry. 8. Aberdare, Hirwaun, Cardiff.—Var. *glabrata* Aschers. & Graebn. 5. Port Talbot. 8. Aberdare, Cardiff.—*A. sativa* L. An occasional outcast.

Bromus madritensis L. 3. Swansea, *Gutch*. 5. Port Talbot. 8. Cardiff. — *B. tectorum* L. 5. Port Talbot. 8. Aberdare, Cardiff. — *B. rigidus* Roth. 5. Port Talbot. 8. Cardiff. — *B. secalinus* L. 5. Port Talbot. 7. Cadoxton, St. Athan's. 8. Aberdare, Cardiff. Aubrey Arms, *Storrie*. 9. Llanishen.—Var. *velutinus* (Schrad.). 1. Penard Castle, *Ball*. 8. Cardiff. — *B. arvensis* L.

4. Glyn Neath, *Hb. Br. Mus.* 5. Port Talbot. 6. S. Cornely. 8. Aberdare, Cardiff. — *B. japonicus* Thunb. var. *grossus* Asch. & Graebn. 8. Cardiff Docks. — *B. brizæformis* Fisch. & Mey. 8. Aberdare.—*B. unioloides* H. B. & K. 2. Pontardulais. 5. Port Talbot. 8. Aberdare, Llandaff, Cardiff.

Cynodon Dactylon Pers., *Cynosurus echinatus* L. 8. Cardiff, alien, *Storrie.*

Eragrostis minor Host. 5. Port Talbot Docks.

Gastridium lendigerum Gaud. 8. Penarth, *Woods.* Cardiff, *Hb. Cardiff.* A ballast plant in both localities.

Gaudinia fragilis Beauv. 7. Cold Knap.

Glyceria festucæformis Richt. 5. Port Talbot Docks.

Heleochloa schenoides Host. 8. Cardiff, *Storrie.*

Hordeum vulgare L. 5. Port Talbot. 8. Aberdare, Cardiff.

Lagurus ovatus L. 8. Penarth Ferry, and Grangetown, *Storrie.*

Lepturus incurvatus Trin. 8. Cardiff Docks.

Lolium rigidum Gaud. 5. Port Talbot. 8. Aberdare.—*L. temulentum* L. and var. *arvense* With. 5. Port Talbot. 8. Aberdare, Cardiff.

Panicum sanguinale L. 8. Ballast, Cardiff, *Storrie.*—*P. glabrum* Gaud. 8. Ballast, Cardiff, *Hb. Cardiff.*—*P. Crus-Galli* L. 5. Port Talbot. 8. Aberdare. Cardiff, *Hb. Cardiff.* — *P. capillare* L. 8. Aberdare, Llwydcoed.—*P. miliaceum* L. 8. Aberdare. Penarth, *Hb. Cardiff.*

Phalaris canariensis L. 2. Pontardulais. 3. Swansea, *Gutch.* 5. Aberafan. 7. Barry, Swanbridge. 8. Aberdare, Cardiff, Taffs Well.—*P. paradoxa* L., *P. cærulescens* Desf. 8. Cardiff, *Hb. Cardiff.* —*P. minor* Retz. 5. Port Talbot.

Phleum phleoides Simonkai. 8. Cardiff, *Storrie.*

Poa Chaixii Vill. 8. Aberdare. — *P. palustris* L. 8. Cardiff Docks.

Polypogon monspeliensis Desf. 8. Cardiff. — *P. littoralis* Sm. 8. Cardiff, &c., *Storrie.*

Secale cereale L. 5. Port Talbot. 8. Aberdare, Cardiff.

Setaria viridis Beauv. 5. Port Talbot. 8. Aberdare. Cardiff Docks, &c., *Hb. Cardiff.*—*S. glauca* Beauv. 8. Aberdare. Cardiff, &c., *Hb. Cardiff.*—*S. verticillata* Beauv. 8. Cardiff, &c., *Storrie.*

Triticum ovatum Rasp. 5. Port Talbot Docks. 8. Cardiff, *Hb. Cardiff.*—*T. trunciale* Rasp. 8. Cardiff, *Storrie.* — *T. vulgare* Vill. 5. Port Talbot. 8. Cardiff. — Var. *anglicum* Aschers. & Graebn. 5. Port Talbot.

Zea Mays L. 4. Jersey Marine. 8. Aberdare, Cardiff.